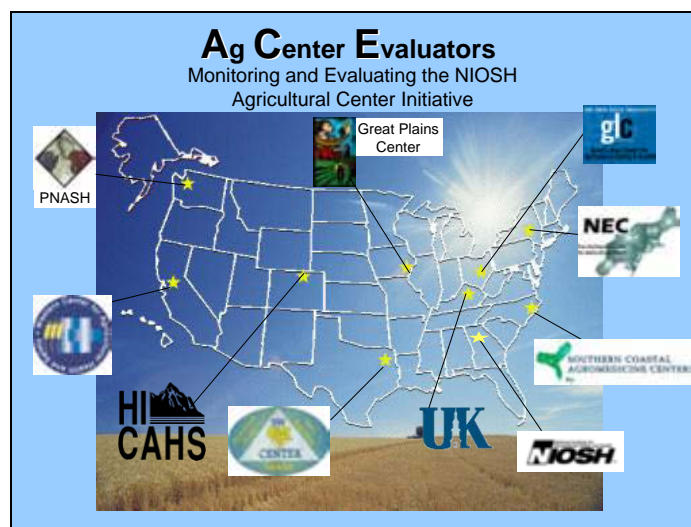


Agriculture, Forestry, Fishing, Safety, & Health



NIOSH Agricultural Center Initiative Evaluation Project January 2008

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The NIOSH Agricultural Center Initiative Evaluation Project

Fiscal Year 2007 Report



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EXECUTIVE SUMMARY

NIOSH Agricultural Center Initiative Evaluation Report – Fiscal Year (FY) 2007

Introduction

The Agricultural Health and Safety Center Initiative began with the development of two Centers in 1990 funded by the National Institute for Occupational Safety and Health (NIOSH). Due to the vast regional differences in agriculture, a classification including products and practices in forestry and fishing as well, across the United States, NIOSH chose to add additional Centers roughly corresponding to Public Health Service Regions. In FY 2007, the Initiative consisted of nine Agricultural Centers* mandated to undertake research, develop prevention and education programs and provide consultation to constituents across the United States.

The mission of the Initiative is to reduce injury and disease in one of the most hazardous occupational classifications in the United States, agricultural production. This mission is to be accomplished by addressing the following objectives:

1. Conduct research related to the prevention of occupational disease and injury among agricultural/forestry/fishing producers, workers and their families.
2. Develop, implement and evaluate educational and outreach programs for promoting health and safety for production agriculture/forestry/fishing including owners, workers and their families. This would include providing consultation and/or training to researchers, health and safety professionals, graduate/professional students, and agricultural extension agents and others in a position to improve the health and safety of agricultural workers.
3. Develop, implement and evaluate model programs for the prevention of illness and injury among agricultural producers, workers and their families.
4. Develop linkages and communication with other governmental and non-governmental bodies involved in agricultural health and safety with special emphasis on communications with other agricultural health and safety programs (PAR-06-057).

The attached report provides documentation of the projects, activities, products, projects and contact counts information for accomplishments of the NIOSH Agricultural Center Initiative during FY 2007. It also includes a section on outcome assessment related to cross Center projects and a review of trends related to the accomplishments of the Centers for those years the Agricultural Center Evaluation (ACE) project was funded. The reader is encouraged to review the full report for more specific information than this summary can provide.

*The 10th Center administered by NIOSH, The National Children's Center for Rural and Agricultural Health and Safety, responds to different legislation as well as different mission and objectives.

Background

An external review of the Center Initiative (Kennedy, 1995) recommended that the Centers work together to evaluate their progress. In 1997 the High Plains Intermountain Center for Agricultural Health and Safety (HICAHS) submitted for funding to begin the Initiative evaluation effort. Representatives from existing Centers attended biannual workshops, hosted by HICAHS, and collaboratively developed an Initiative database and defined indicators of progress on objectives. Reports were produced by the evaluation group for fiscal years 1999, 2000 and 2001.

Current ACE project – aims and methods

In the fall of 2004, a new contract, entitled “The NIOSH Agricultural Disease and Injury Research, Education and Prevention Centers Evaluation Project” (#212-2004-09852) was awarded to HICAHS to renew the Agricultural Center collaborative evaluation effort. There were two key evaluation requirements stipulated by the contract. The first was to review and modify the monitoring model developed earlier utilizing the ACCESS™ database. The second requirement of the contract was to develop and pilot a cross-site evaluation model to assess the impact of multiple agricultural initiative projects, with similar aims, on the safety and health of agricultural workers and their families. Each Center designated a representative to the Agricultural Center Evaluation (ACE) project and two workshops were held in January and June of 2005 to accomplish the first objective. A five month pilot of the revised database was completed and reported on for fiscal year 2005, and a full year’s worth of Initiative activities, products and projects was undertaken for fiscal year (FY) 2006. The current report covers program monitoring data for FY 2007, describes the projects and results from the cross Center outcomes assessment experiment and presents a preliminary trend analysis based upon the ACE reports produced since 1999.

Initiative accomplishments FY 2007 – Program monitoring

Eight of nine Centers (Great Plains did not submit data) collected and entered data pertaining to their individual Center projects into a copy of the ACCESS™ database. Individual Center databases were forwarded to HICAHS for aggregation and reporting. It is important to note that three of the reporting Centers (Great Lakes, Southern Coastal and HICAHS) were operating on bridge funding during FY 2007 as they sought to reapply for full Center status. In addition, the number of projects funded was reduced for those Centers fully funded in the fall of 2006 through Fall 2007 due to both the review process and a reduction in extramural funding allocation. The cumulative data, while representing fewer projects (87), provided the required data to address eleven evaluation questions which are briefly reviewed below.

1. What were the target populations or audience contacts by specific activities of the Center Initiative during FY 2007?

Center activities are reported in two ways: by those involving direct constituent contact nearly 55,000 counts and by material distribution such as newsletters, newspaper articles, and publications 638,000 counts. Taken together, Centers reached over 692,000 constituents during FY 2007.

2. What were the target groups of Center Initiative work during FY2007?

There were 32 categories of stakeholders the Centers worked with ranging from the general public (primarily outreach education), to specific groups such as migrant or seasonal workers, agricultural workers, primary school age children and Cooperative Extension agents to name a few.

3. What research projects did the Center Initiative undertake in FY 2007?

There were 31 research projects reported which identified a NORA priority area. There were 10 in Disease and Injury, 14 in Work Environment and Workforce, and 7 related to Research Tools and Approaches. Since a number of these projects fit more than one NORA priority area, the numbers reported are based upon the first category chosen.

4. What special sector activities has the Center Initiative undertaken during FY 2007?

The vast majority of reported special sector activities targeted ethnic minority or migrant workers in agriculture (53%) or children (35%). Other groups represented include women, and ethnic minority adults and elderly adults.

5. What products has the Center Initiative produced in FY 2007?

Two hundred and seventy-five products were developed by the Initiative in 2007: 21 percent were feature or professional articles and 17.5 percent were professional presentations. Products include a broad array of ways to disseminate results of Initiative work, including newsletters, websites, exhibit materials, videos and CDs.

6. What collaborative efforts have occurred during FY 2007?

Centers reported 394 collaborative opportunities for projects with a variety of organizations and entities during 2007. These collaborators, such as various academic disciplines, health care providers and agricultural organizations provide not only expertise to projects, but also routes of information dissemination.

7. For what degrees and professional disciplines did the Center Initiative provide education during FY 2007?

Students received Masters of Public Health degrees (5), Masters of Environmental Health degrees (3) followed by, Masters of Social Work (1). Two doctoral level degrees were granted, one in nursing and one in Environmental Health.

8. What was the reported monetary value leveraged by the Center Initiative (in dollars and in-kind support) during FY 2007?

Centers reported leveraging \$430,700.00 dollars in the past year: \$320,600 in dollars and \$110,100 in-kind dollar equivalents from other funding sources.

9. In which states was the Center Initiative active during FY 2007?

The Agricultural Center Initiative was active in all of the United States as well as several foreign countries during 2007. Twenty seven states were cited as related to specific Center outreach efforts. Three states: Kentucky, Texas and Washington reported the most state contacts representing outreach efforts by feature articles in newspapers, and newsletter distribution.

10. What types of agriculture were addressed nationwide by Center projects?

Thirty-three percent of Center projects (29 of 87) reported a specific type of agriculture was addressed. Forty-eight percent of these Initiative projects identified all agriculture as a target for their work, for example, the National Tractor Safety Initiative or projects specific to child health and safety. The next largest sector identified was livestock production.

11. What research to practice (r2p) accomplishments were undertaken during FY 2007?

Of the 87 reported projects for FY 2007, 69 (79%) identified a category of r2p arising from the work involved. Seven of eight r2p categories (defined with the assistance of NIOSH) were represented, with the largest percent listing “research to intervention & education” (43 of 69 or 62%), followed by “research to research” (13%) and “research to field use” (7%).

Initiative accomplishments 2007 - Outcomes assessment

The ACE team completed work on the second primary evaluation requirement, that of identifying projects and developing processes to attempt cross-Center project outcome assessment. The two topic areas that provided the potential for this step were: 1) the development and testing of high school agricultural health and safety curricula and 2) professional development classes or training efforts. All nine Centers originally participated by providing a project in at least one of these assessment efforts; however the realities of applied research efforts reduced the number of projects that ultimately provided data.

The ACE team developed criteria for the projects to be included in this effort, and each Principal Investigator (PI) was requested by their Center representative to ACE to send first an abstract and then the results of their project to HICAHS. The criteria were minimal but required a quasi-experimental design and pre/post testing of participants related to project educational aims or knowledge acquisition. The abstracts (included in the FY 2006 report) helped identify differences in project scope, target group and methods; these differences presented a challenge and opportunity for the team.

High School Curricula Projects

Out of the original four projects selected to participate, two were able to meet the criteria and submit pre/post data on knowledge gained by participants. Both projects were complex and involved developing strong links with school districts and existing curriculum. One developed material approved to include in state approved curriculum (Southeast Center), the other developed curriculum for vocational agricultural classes in two states (HICAHS). Students participating in both projects achieved significant increase in knowledge as reported on pre/post tests. It is important to recognize that both projects addressed much more than changes in knowledge.

Professional Development Projects

Seven projects were originally selected to participate in the professional development area, with PIs again providing abstracts and requested to forward data to HICAHS. Out of the seven, four projects were able to meet the criteria and be included in this report. The projects not included were dropped due to lack of an adequate sample size

(Children's Center), inability to forward report in time (Southern Coastal) and lack of pre/post testing (Great Plains Center).

The four projects included did report an increase in participant knowledge from pre/post testing, or between treatment and control groups, although it was not possible to establish statistically significant change in two projects either due to low sample size or identified trend rather than statistical significance.

Results

There were several important outcomes of this experiment in cross Center project outcomes assessment. There was a tremendous collaborative effort on behalf of the ACE team members as each member sought projects from their Centers to participate. It is important to reiterate that all of the projects selected had been funded for at least one year, and that the PI was not anticipating participating in a cross-comparison process at the time the study was proposed. While the intent was originally to compare results via standardizing effect size, the types of data collected did not lend themselves to such an analytical approach. Each individual project in both selected areas addressed different target groups, utilized different designs and treatments and measured different outcomes. The desire to undertake analysis across projects proved to be untenable from a statistical perspective, however the opportunity to learn from different approaches to similar agricultural health and safety educational concerns should provide valuable models to future researchers who may be anticipating similar research. Based upon this experience, several recommendations are included in the report for both Center personnel and NIOSH.

Discussion

The 2007 fiscal year report represents the work and accomplishments of the staff, collaborators, and partners of the eight reporting Agricultural Centers undertaking research, prevention and education on behalf of those working in agricultural/forestry /fishing (AFF) occupations across the United States.

The report covers both cumulative results from the program monitoring approach to evaluation as well as the cross Center outcome assessment experiment in two areas of Initiative work: High School Health and Safety Curricula and Professional Development Projects. It is hoped that this approach to cross-project, multi-Center evaluation may provide a variety of models (as well as collaborative opportunities) that may assist future projects to incorporate agricultural health and safety into high school education and to deliver effective professional development.

The Centers which make up the Agricultural Initiative (minus Great Plains) provided data in the ACCESS™ database to HICAHS for aggregation. A number of limitations to this monitoring process are presented in the report and represent some of the methodological limitations of all multisite evaluation efforts.

This year for the first time we sought to illustrate the potential of trend analysis that is provided by a program monitoring approach to evaluation. This effort is limited due to the interruptions in data collection that have occurred. It is possible that some of the changes observed may be attributed to the funding cycle stage in which the Initiative is at any one point in time. The opportunity to follow the Center Initiative through a full five

years would provide the opportunity to test such a hypothesis, as it seems logical that activities would vary during the life cycle of a grant.

Recommendations and conclusions

The ACE team has now completed one pilot and two full years of program monitoring under the current contract. The results presented in the report describe a range of activities across diverse agricultural, forestry and fishing operations throughout the country seeking to prevent or reduce injuries and illness on behalf of those in these occupational settings.

The ACE team has done a remarkable job documenting the activities, products, outreach, and translation efforts of Initiative projects. The ability of the NIOSH funded Centers to respond to regional agriculture/forestry/fishing differences and needs is both the genius of the Initiative and the challenge to evaluation. In spite of fewer fully funded Centers, the Initiative has many accomplishments related to agricultural health and safety during FY 2007; both projects and products are identified in the appendices of the report. We believe that the Centers, through their in-kind participation in the ACE process, collectively illustrate that they accept the charge to evaluate.

While the primary recommendation remains to continue evaluation of the NIOSH Agricultural Initiative, additional recommendations are included in the full report and are ultimately dependent upon NIOSH response to the National Academy of Science (NAS) review of this cooperative agreement.

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Evaluation Report NIOSH Agricultural Center Initiative Fiscal Year (FY) 2007

Introduction

The Agricultural Health and Safety Center Initiative in FY 2007 consisted of nine Centers funded by the National Institute of Occupational Safety and Health (NIOSH) to undertake research, develop and evaluate prevention programs and develop and evaluate education programs as well as provide consultation and outreach across the ten Public Health Service regions of the United States. The mission of these Centers is to reduce injury and disease in one of the most hazardous occupations in the United States, agricultural production. The term agricultural production includes forestry and fishing as well as farming and ranching (AFF). The most recent statistics for this occupational sector are for 2006 and reflect the following: the fatality rate for AFF was 29.6 per 100,000 workers and the nonfatal injuries and illnesses were reported at a rate of 6.0 cases per 100 full time workers (CFOI and BLS). It is important to note that the latter statistic does not reflect farm operations with fewer than 11 employees, yet small family farms account for approximately 90 percent of the farms in the U.S (USDA:ERS, 2005). The locations, full Center titles, and primary contacts of each of these Centers are identified on the map presented on the inside front cover of this report.

In the fall of 2004 NIOSH funded an evaluation contract to undertake both an accountability (program monitoring) and outcomes assessment evaluation on the Center Initiative. In January 2006, the first evaluation report was published including both a pilot accountability evaluation, representing five months of accomplishments during fiscal year 2005, and the plan proposed to evaluate outcomes on cross Center projects. This report is the second in this contract funding cycle that includes a full fiscal year of program monitoring data and a summary of the cross-Center projects selected for outcomes assessment.

Background

In 1990 the National Institute of Occupational Safety and Health (NIOSH) began an Initiative to address one of the most hazardous and long ignored occupations in the nation, that of agricultural production. Due to the vast regional differences in products and practices across the country, NIOSH chose to fund the development of multiple Centers roughly corresponding to Public Health Service regions. As a cooperative agreement, the Centers and NIOSH address the objectives of the Agricultural Center Health and Safety Initiative which are to:

1. Conduct research related to the prevention of occupational disease and injury among agricultural producers, workers and their families.
2. Develop, implement and evaluate educational and outreach programs for promoting health and safety for production agriculture including farmers, workers and their families. This would include providing consultation and/or training to researchers, health and safety professionals,

graduate/professional students, and agricultural extension agents and others in a position to improve the health and safety of agricultural workers.

3. Develop, implement and evaluate model programs for the prevention of illness and injury among agricultural producers, workers and their families.
4. Develop linkages and communication with other governmental and non-governmental bodies involved in agricultural health and safety with special emphasis on communications with other agricultural health and safety programs. (PAR-06-057)

An external evaluation of the Center Initiative in 1995 (Kennedy Report) encouraged the Centers to work together to develop a cross-site evaluation of the Center Initiative. In response to this recommendation, a collaborative multisite evaluation design of the Center Initiative was proposed by the High Plains Intermountain Center for Agricultural Health and Safety (HICAHS) and NIOSH agreed to fund workshops to develop the evaluation approach in 1997. Over the next three years, a team of representatives from each Center and NIOSH developed a program monitoring approach to Initiative accountability. A six month pilot of the evaluation was completed for fiscal year 1999, with a report issued in early 2000. Centers continued to gather data based upon the indicators and variables selected and defined by the evaluation team for two full years, with reports issued for fiscal years 2000 and 2001. There was a funding hiatus for Initiative evaluation after completion of the FY 2001 report.

The NIOSH Agricultural Center Evaluation Project

In the fall of 2004, a new evaluation contract was awarded to the High Plains Intermountain Center for Agricultural Health and Safety (HICAHS: V. Buchan & H. Holmquist-Johnson, #212-2004-09852) renewing the Agricultural Center Initiative evaluation effort. Each Center designated a representative to become a member of the collaborative Agricultural Center Evaluation Team (ACE), and two workshops were held in January and June of 2005.

There were two key requirements to be addressed; the first was to ensure continuation of Ag Center initiative evaluation process. The monitoring model that had been developed for 2000 and 2001 reports was reviewed, and modifications as well as additions were made to the variables to be included and to the definitions of those variables. The second requirement was to develop and pilot a model for evaluating the impact of some of the currently funded Agricultural Initiative projects on the safety and health of agricultural workers and their families.

Contract Goals, Procedures and Challenges

Program monitoring

The first aim of this evaluation project is to document Initiative progress on the NIOSH objectives for the Agricultural Centers. The contract objectives related to this model and addressed by the Center evaluators during the 2005 and 2006 workshops included:

- Review current/existing program monitoring strategies
- Recommend modification as necessary for the database used by each Center to collect data and forward to HICAHS

The model, program monitoring, provides a picture of the scope, reach, and intensity of Initiative work across the nation. A monitoring approach to evaluation of the Initiative provides “administrative intelligence,” that is access to the information improves Initiative and Center planning, enhances collaboration opportunities, addresses accountability and helps set the stage for targeted outcome assessment (Rossi, Freeman & Lipsey, 2004).

After the first workshop (January, 2005) and based upon the recommendations of the ACE team, the lead center revised both the AccessTM a database and the definitions of the key variables or indicators. A copy of the new database was then forwarded to each team member to enable data collection at their Center May 1, 2005 through September 30, 2005. After this pilot period when eight of the ten Centers collected data, minor revisions were made to the database which has then been used for FY 2006 and this current report on FY 2007. Centers, utilizing various methods of data collection on projects, enter and forward that data to HICAHS for collation into an Initiative database; HICAHS then provides data analysis and reports on the work of the Initiative for the most recent fiscal year.

Outcome assessment

The second aim of the evaluation contract is to develop and test an outcomes assessment model on a minimum of two types of projects, with each project type funded at several Centers. A primary concern during the development of this model was to reduce as much as possible any additional data collection burden for the various project investigators as the projects were already underway as funded. The contract aim of the outcome assessment model is:

....to develop potential program logic models for conducting short term targeted outcome or impact assessment on two focused target areas, in a minimum of at least three Centers to serve as a pilot or model of cross Center project evaluation.

The two project target areas identified by the team that multiple Center projects addressed were: 1) High School Agricultural Health and Safety Curriculum and 2) Professional Development for those most likely to provide health and safety services to agricultural workers and their families. During the second 2005 workshop, logic models were developed for each of the projects included in the two selected categories to search for potential outcome measure commonalities. All four of the identified High School Agricultural Health and Safety Curriculum projects included pre/post knowledge measures. Four of the seven originally selected Professional Development projects included pre/post, and one included comparative treatment and control groups instead.

The ACE database and National Academy of Sciences (NAS) review of NIOSH

In April of 2006, a number of ACE team members and Center Directors had the opportunity to meet in Washington, D.C. during the first NORA II conference. At that time, we met with Dr. Roy Fleming to discuss the Agricultural Center Initiative's response to the data requirements of the National Academy of Sciences (NAS) Evaluation review of NIOSH. As the Centers already had a defined database, we were able to provide Dr. Fleming with a model of evaluation data collection for the review period (1996-2006).

Challenges

The success of any evaluation is greatly increased if it is "built in" from the beginning of program planning (Rossi, Freeman & Lipsey, 2004). The original NIOSH Center Initiative objectives included the need to evaluate individual projects within each Center, but lacked a clear agenda to address the Initiative as whole until the resurrection of the Evaluation Project contract in 2004. Additional challenges include the great variance between the Centers' approaches to fulfilling NIOSH objectives due to differences in auspices, resources, expertise and regional agriculture.

An additional challenge to both program monitoring and the cross site impact assessment efforts are Center personnel changes. The lead Center has incorporated updates and abbreviated training on the ACCESS database into each workshop, but it is clear that personnel changes, while unavoidable in a large Initiative, impact data collection and reporting. Initiative evaluation efforts are enhanced when there is stability

in the personnel identified at each Center responsible for both data collection and ACE team membership.

A final challenge has been the lack of stable funding to support Initiative wide evaluation. Funding has been somewhat sporadic beginning with the first Workshop in 1997, with a hiatus between 1998 and 1999, and then again between January, 2002 and September 2004, when the current contract was announced and awarded. The ACE team has made remarkable progress in spite of these challenges in their efforts to present a national vision of the accomplishments of the Agricultural Center Initiative.

Acknowledgements

NIOSH as a collaborative partner

The importance of the NIOSH role as a federal collaborative partner in this process cannot be overemphasized. First, NIOSH has provided administrative personnel to assist the Center evaluators; these contacts have been supportive and very helpful in assisting the evaluators and HICAHS with suggestions, definitions and updates from NIOSH. NIOSH has also provided three important concepts that continue to assist the evaluation effort. The first framework is provided by the Initiative objectives that the Centers are to respond to based upon each Center's region and expertise. The second is the National Occupational Research Agenda (NORA I) which provides a categorization scheme for all Initiative research projects. NORA has since been under major review and reformulation in the development of NORA II, to which the evaluation project will adjust. The third and most recent indicator has been the "r2p" (Research to Practice) concept; which the team has defined with the assistance of NIOSH.

Center representatives

The staff at the lead Center would like to express our deep appreciation to each current and past members of the ACE team (current members are listed on the inside back cover) for their time, travel, ideas and efforts in reinstating the Agricultural Health and Safety Center Initiative evaluation project. Members of the team have volunteered for assignments related to helping with the database, editing the reports and numerous other additional duties that have enhanced the team's accomplishments. This report is only possible because of a truly dedicated and collaborative team.

Evaluation Methodology, Results, and Limitations

Program Monitoring

Program process evaluation consists of continuous monitoring of indicators of selected aspects of program process. ...it can be a useful tool for facilitating effective management of social programs by providing regular feedback about how well the program is performing its critical functions. (Rossi, Freeman & Lipsey, 2004, p. 177).

Beginning in 1997, the evaluation team utilized workshops and conference calls, over a period of several years, to develop and define a list of indicators reflecting Initiative objectives. The current ACE team has maintained a collaborative approach to this evaluation effort made possible by workshops during 2005, 2006 and 2007 held in Fort Collins, Colorado, as well as utilizing conference calls and email communication. Based upon prior experience with use of an ACCESS monitoring database, a number of revisions were recommended by the ACE team and incorporated into 2005, 2006 and 2007 data collection and processing. Figure 1 below is a simplified overview of the variables included in the current ACCESS database. Each Center again, as in earlier years, received a copy of the Initiative database for FY 2007 which was used to input Center data. Members were also able to make additions for their own Center's internal monitoring needs. The ACE team set a date of November 1, 2007 to forward data to HICAHHS for aggregation. Due to the need for one Centers' data to be finalized in a compatible format, the last Center's data set was not received for aggregation until January 29, 2008.

Figure 1. Database Overview

IDENTIFYING INFORMATION					
Center Name	Project Title and Description	Center/Project Objective	PI or Project Contact Person	Project Dates	
KEY INDICATORS					
Type of Agriculture	Contact Numbers	Activities	Academic Degrees	Products	Audience Demographics
Collaboration	Leveraging	Regionalization	Special Sector		
NIOSH SPECIFIC INDICATORS					
Core	NORA		Research to Practice		
Administrative and Planning	Priority Research Area (for Research)		Research to:		
Education and Outreach	Disease and Injury		Intervention and Education		
Multi-Disciplinary Research	Work Environment and Workforce		Research		
Prevention-Intervention	Research Tools and Approaches		Field Use		
			Policy		
			Academia		
			Evaluation		
			Technical Assistance		
			Surveillance		

Program Monitoring Questions

1. What were the target populations or audience contacts by specific activities by the Center Initiative during FY 2007?

Center personnel across the Initiative were very active during FY 2007, engaging constituents in multiple types of activities related to agricultural health and safety. The activities presented below are divided into two basic contact types: direct (active) contact counts with constituents, equated to 55,000 (Table 1); and product distribution (passive) contact with constituents, such as newsletters, newspaper articles, and publications, totaled 638,000 counts (Table 2). Combining these two totals, the Center Initiative reached over 692,000 constituents during FY 2007. Both tables present approximate numbers, as Center personnel vary in specificity of reporting, however they are presented as an indicator of the work of the Centers with multiple target groups.

Table 1. Initiative activities directly involving constituents

Activity Type	Contacts
Material Development	17,040
Website Hit Counts	11,125
Material Distribution	9,085
Workshop – Arrange	5,157
Data Collection	3,165
Outreach Education	3,091
Conference – Arrange or Present	2,328
Professional Presentation	1,039
Conference – Attend	737
Stakeholder Meeting	574
Training	391
Testing/Screening	183
Data Analysis	171
Exhibit	160
Resource Cultivation	150
Academic Lecture/Education	85
Consultations	65
Professional Development	31
Focus Group	18
Curriculum Development	15
Media Interview	11
Continuing Education	10

Table 2 presents indirect stakeholder contacts via material distribution, such as publications or newspaper articles (reported by circulation) and newsletters (reported by distribution lists). It is important to note, that while the numbers presented in Table 2 appear to be large, a primary objective of the Center Initiative is to translate information gained from research, intervention and evaluation projects to persons

working and living in agricultural settings. Examples of far-reaching efforts to translate research findings to practice include newspaper articles which could reach up to 110,000 subscribers. According to needs assessments, these methods of communication have also been the most requested by persons employed in agriculture, as access is both easy and convenient.

Table 2. Initiative product distribution frequency

Product Type	Frequency
Article Published, feature (trade publication)	509,620
Article Published, professional (juried publication)	81,306
Website hits or Webpage Established	23,930
Manuscript	9,295
Brochure	4,253
Newsletter	2,250
Questionnaire or Survey Instrument	1,922
PowerPoint™ Presentation	1,538
Exhibit Material	1,150
Curriculum (training)	818
Poster	670
Abstract	665
Fact Sheet	210
Report (unpublished)	112
Evaluation Instrument / Tool	112
CD-ROM	100
Database	79
Annual Report to NIOSH	25
Course Manual	20

2. What were the target groups of the Center Initiative work during FY 2007?

The Agricultural Center Initiative had a broad range of target groups for projects and products during 2007. As illustrated in Table 3 below, the vast majority of efforts were targeting either agriculture/forestry/fishing (AFF) in general or more than one group within the agricultural community. The large numbers in Table 3 again represent dissemination of information and corroborate the contact numbers. The groups include a number of key constituent groups that assist with dissemination of Center work, such as health professionals, manufacturers, Cooperative Extension agents and educators.

Table 3. Agricultural Center target groups by frequency of contacts

Target Group	Contacts
General Public	398,064
Multiple/Variou Target	120,625

Agriculture (General)	47,386
Academic Faculty	43,556
Agricultural – Farm/Ranch	15,522
Health Professionals	7,761
Children/Students secondary school	7,547
Parents	7,160
Agricultural Employees	4,462
Agricultural Owner/operator	4,156
Farmworker Health Advocate	2,206
Children / Students primary school	2,206
Farm Families	2,056
Researchers	1,779
NIOSH/Ag Centers	902
Students – College/University	856
Cooperative Extension	841
Teachers/Educators	726
Agricultural – Fishing/Hunting	426
Agricultural Business	404
Advisory Committee	353
Migrant Seasonal Farmworker	353
Advocacy Groups	304
Agricultural Producer	195
State Agencies	136
Legislators	101
Teachers	90
Community Based Organizations	86
Media/Marketing Agents	64
Agricultural Services	32
Public Health Agencies	2
Workers Compensation/Insurance	2

3. What research projects did the Center Initiative undertake in FY 2007? By NORA research priority?

Of the 87 reported Center projects, 31 projects categorized under the research core are reported according to the priority research areas under NORA I. It is recognized that NORA is in the process of changing to the sector-based research agendas; however, NORA I was still operational during 2007. The subcategory with the most projects was Special Populations at Risk; similar to FY 2006. Table 4 presents an overview of the projects by NORA priority; specific project titles are listed in Appendix A under the Research Core heading.

Table 4. Center Initiative research projects by NORA priority

Category	Priority Research Areas	Projects
Disease and Injury	Allergic and Irritant Dermatitis	4
	Asthma and Chronic Obstructive	
	Pulmonary Disease	

	Fertility and Pregnancy Abnormalities	
	Hearing Loss	1
	Infectious Diseases	
	Low Back Disorders	1
	Musculoskeletal Disorders of the Upper Extremities	1
	Traumatic Injuries	3
Work Environment and Workforce	Emerging Technologies	1
	Indoor Environment	
	Mixed Exposures	1
	Organization of Work	
	Special Populations at Risk	12
Research Tools and Approaches	Cancer Research Methods	
	Control Technology and Personal Protective Equipment	1
	Exposure Assessments Methods	3
	Health Services Research	
	Intervention Effectiveness Research	1
	Risk Assessment Methods	
	Social and Economic Consequences of Workplace Illness and Injury	
	Surveillance Research Methods	2

4. What special sector activities has the Center Initiative undertaken during FY 2007?

The Center Initiative continues to focus on activities related to special sector populations as illustrated in Table 5. It is clear that the Centers made a concerted effort to undertake research and provide information, education and services for a variety of ethnic groups working in agricultural production. Where it is possible to break down the Center work into more specific subgroups, we have done so. Where no specific ethnicity or age group is noted, the demographic information is not provided.

Table 5. Special sector target group contacts by percent

Special Sector	Frequency	Subgroup %	%
Ethnic Minority Workers	2,374		37.2
Hispanic	1,945	81.9	
Asian	326	13.7	
Native American	103	4.3	
Children	2,211		34.6
White/Non-Hispanic	1,812	82.0	
Hispanic	354	16.0	
African American	45	2.0	
Migrant Workers	1,024		16.0
Hispanic	982	95.9	
No Ethnicity Noted	42	4.1	
Women	369		5.8
Adults	303		4.7
Hispanic	267	88.1	
Asian	30	9.9	
African American	6	2.0	
Elderly Adults	54		.8
Disabled	34		.5
Older Workers	16		.2
White/Non-Hispanic	14	87.5	
African American	2	12.5	
TOTAL	6,385		

5. What products has the Center Initiative produced in FY 2007?

A total of 275 products were reported as having been developed during the 2007 monitoring period; 17.5% of these were PowerPoint presentations. In reviewing the list of products and the variety represented, it becomes very clear that the majority reflect efforts to provide information or education to various target groups. Table 6 lists the product categories, frequencies and percents of each type. All products reported are presented in Appendix B, listed by type of product with the language and authors identified. One caveat is that a number of the products, such as websites did not have specific titles and therefore are not included in the appendix listing.

Table 6. Center Initiative products by category, frequency and percent.

Product Count	Frequency	%
PowerPoint Presentation	48	17.5
Article, Professional	34	12.4
Article, Feature	23	8.4
Questionnaire or survey instrument	18	6.5
Report to NIOSH	15	5.5
Manuscript/Reports Unpublished	15	5.5
Website	14	5.1
Posters	14	5.1
Fact Sheets/Booklets/Brochures	13	4.7
Abstracts	13	4.7
Report (unpublished)	9	3.3
Newsletters	8	2.9
Year-End Report to NIOSH	7	2.5
Databases	6	2.2
Evaluation instrument/tool	6	2.2
Brochures	6	2.2
PowerPoint Presentation (for distribution)	5	1.8
Curriculum (training)	5	1.8
Exhibit Materials	5	1.8
CD-ROMs	3	1.1
Booklets	2	.7
Curriculum (short course)	1	.4
Course Manual	1	.4
Checklist	1	.4
Book Chapter	1	.4
Annual Report	1	.4
Theses/Dissertations	1	.4

6. What collaborative efforts have occurred during FY 2007?

A total of 394 collaborative efforts were reported by the Initiative this past year. These efforts could be related to activities and/or products as well as Center projects. Table 7 presents the types of collaborators, illustrating the remarkable range of partnerships that the Center Initiative fosters and maintains to address the Center mission. While both NIOSH and other Agricultural Centers are identified as partners, it is encouraging that there are so many collaborators outside of the Initiative.

Table 7. Center collaborations by organizational type and frequency

Organizational Type	Frequency
University, academic department	62
Health Care Provider/Organization	47
Agricultural Centers (other than own)	43
Cooperative Extension	37
Governmental Agency (other)	34
University, academic research center	31
School(s)	24
University, institute or internal organization	21
Agricultural Organizations	18
Producer/Grower	13
NIOSH	12
Community Organization	12
Multiple types – non-specific	8
Health Department	7
Media	6
Equipment Dealer	4
Labor/Employee Organization	4
Research organization	4
Trade Association	2
Agricultural Organizations (focus on children)	2
Agribusiness	1
Insurance Company	1
Technical, Trade or Professional Association	1

7. For what degrees and professional disciplines did the Center Initiative provide education during FY 2007?

The number of professional educational degrees including an agricultural health and safety component reported as granted during 2007 was much lower than for the pilot period and 2006 as only three Centers reported professional education. There were nine masters degrees awarded, five in Public Health, three in Environmental Health, and one in Social Work. Two doctoral degrees, one in Nursing and one in Environmental Health, were awarded during this time period.

8. What was the reported monetary value leveraged by the Center Initiative (in dollars and in-kind support) during FY 2007?

The financial support reported as leveraged by the various Initiative projects decreased considerably in FY 2007. The total dollars reported were \$320,600, and the in-kind dollar equivalent was equal to \$110,100 for a grand total of \$430,700. It is possible that in the first year of most projects, the financial assistance sought from sources other than NIOSH has not yet been provided and reported.

9. In which states was Center Initiative active during FY 2007?

The Agricultural Initiative reported over 635,000 contacts in 27 states, across the U.S. and internationally in 2007. Approximately 140,000 contacts were reported as impacting the nation as a whole this year rather than a specific state. These national contacts involve educational efforts such as articles and newsletters, which explains the broader nationwide impact. The reported contacts are further defined by the type of contact activity in Tables 1 and 2 above. The intensity of contacts in states varies considerably, with the highest levels of state reported activity correlated with proximity to the location of each Center. Of those Centers that reported state specific activity, Kentucky, Washington and Texas each reported over 20,000 contacts.

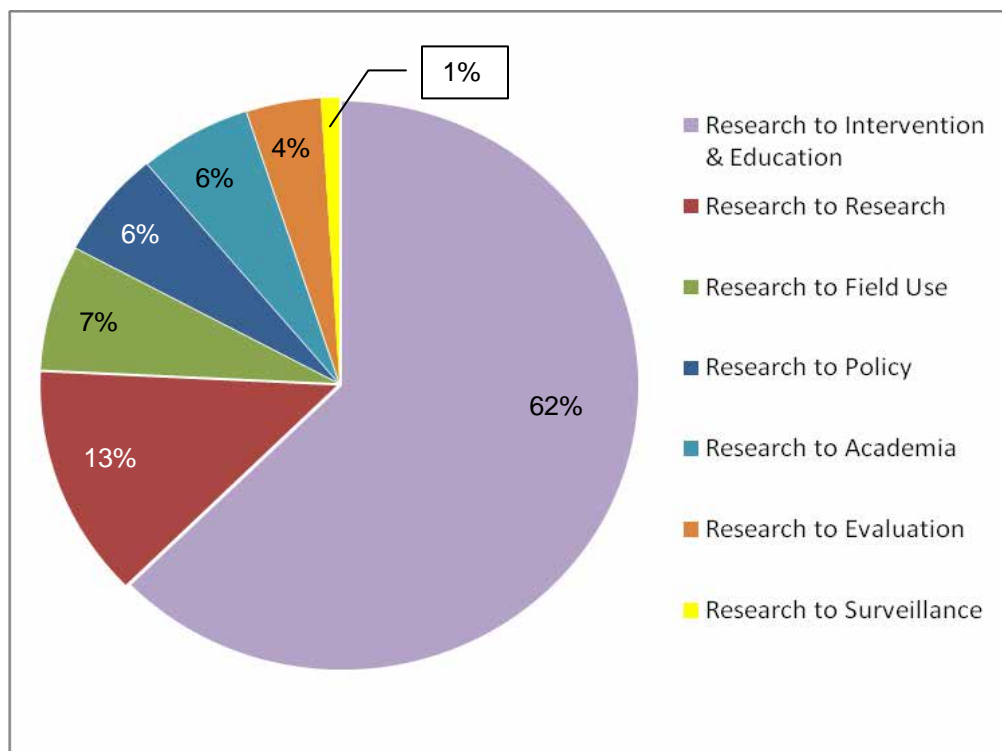
10. What types of agriculture were addressed nationwide by Center projects?

Of the 87 projects reported during 2007, 29 projects (33%) were identified as being related to a particular type of agriculture. Of those projects reporting a type of agriculture, nearly half indicated that they covered agriculture in general; educational efforts with children for example can cover multiple types of agriculture.

11. What research to practice (r2p) accomplishments were undertaken during FY 2007?

Research to practice (r2p) is defined as research findings or products that are accepted and used by Center target audiences. With the assistance of NIOSH, the ACE team defined eight categories of this concept that illustrate various methods of moving Initiative projects into use by others. Out of 87 total Agricultural Center projects 69 (or 79%) were designated as having r2p impact. Figure 2 (below) illustrates the percent of each r2p category reported. It is clear that the concept developed by NIOSH to emphasize the importance of translating study results into practice has been incorporated by the personnel of the Agricultural Initiative.

Figure 2. Research to Practice categories of Center projects by percent



Limitations of program monitoring

Multisite evaluation efforts present methodological limitations for a number of reasons; the most difficult of these challenges is that they are usually begun “after the fact.” The Center Initiative had been in existence for seven years prior to working collaboratively, and each Center had developed its own methods of project evaluation and data collection. The only logical approach therefore was to involve all the Centers, and form a collaborative team approach to developing the evaluation model and implementation procedures.

Both the reliability and validity of the data collected and forwarded to HICAHS are impacted by a number of limitations, key among these are personnel changes. It takes time to train Center team members on both how to collect data on Center projects, and how to enter it into the ACCESS database. Our experience indicates that each time there are personnel changes the potential exists for the Center to lose both data and reliability of that data.

Multi-site evaluation (which involves multiple programs, settings, target populations and contexts) raises a number of measurement reliability issues. It takes time to standardize individual Center interpretations of key variables/indicators, not to mention data collection methods. Part of the responsibility of the lead Center is to increase reliability by data editing as each team member forwards their Center data, a step which provides the opportunity to check back with team members to verify or correct information collected.

Several additional limitations were operant this fiscal year and help explain the reduction in activities, products and other indicators reported.

1. Fiscal year 2007 marked the beginning of a new five year funding cycle for the Agricultural Center Initiative (September, 2006 to October, 2011).
2. Only 6 of the 9 existing Centers were operating as fully funded during FY2007. And overall these Centers had fewer projects funded.
3. The three remaining Centers were operating on “bridge funding” in order to reapply, and thus although they collected data, the numbers related to all indicators counted in the database was greatly impacted
4. One of the fully funded Centers, the Great Plains Center, chose not to participate in the ACE data collection this year.
5. The National Children’s Center for Rural and Agricultural Health and Safety that had participated previously, responds to different requirements, different funding cycles and also did not forward data and was therefore not included.

Outcomes Assessment

Introduction

The second aim of the evaluation contract was the development and piloting of an outcomes assessment model. During fiscal years 2005 and 2006, ACE team members identified potential Center projects and developed procedures to test cross-center evaluation in two project areas. The two areas identified that projects were funded in two or more Centers were:

- 1.) High School Agricultural Health and Safety Curriculum; and
- 2.) Professional Development for Health Care Providers

Four Centers, the Western Center for Agricultural Health and Safety (Western), the Pacific Northwest Agricultural Safety and Health Center (Pacific Northwest), the High Plains Intermountain Center for Agricultural Health and Safety (HICAHS) and the Southeast Center for Agricultural Health and Injury Prevention (Southeast) had projects developing and testing prevention education among high school students. Seven Centers, the National Children’s Center Rural and Agricultural Health and Safety (National Children’s Center), the Great Lakes Center for Agricultural Safety and Health (Great Lakes), the Great Plains Center for Agricultural Health (Great Plains), the Northeast Center for Agricultural Safety and Health (Northeast), the Pacific Northwest Center, the Southern Coastal Agromedicine Center (Southern Coastal) and the Southwest Center for Agricultural Health, Injury Prevention and Education (Southwest) had projects providing health and safety education to health care professionals working with agricultural populations in rural agricultural communities.

Projects in each of these areas were quite different in scope, timelines, amount of funding, target groups and specific aims. It is also important to note that the projects had already been funded by NIOSH and did not include as an aim to collaborate on outcomes assessment. Within each grouping, the projects sought to accomplish their goals with different methods and measure success in different ways. For example, the professional development project of the Pacific Northwest Center sought to increase mid level health care provider’s knowledge regarding the dangers of pesticide exposure

in children; while the Southwest Center project sought to increase student nurse knowledge and self-efficacy related to first aid for rural and medical emergencies. The cross-site outcome for each project was an increase in knowledge measured by pre/post tests, but each also had additional measures of success.

As this cross-site experiment matured it became clear that the goal could not be to compare results, but rather to illustrate for future project personnel what the various prevention education approaches achieved with whom and with which measures. The projects in both high school and professional development illustrate very different and creative ways of seeking to disseminate knowledge to improve agricultural health and safety knowledge with a great variety of target groups. The models described (see extended abstracts) and the results produced will be of use as templates of what to anticipate within given parameters, such as available funding, time and selected methods. They also provide a variety of approaches to evaluation of individual projects addressing the question, “have we increased acquisition of knowledge regarding some aspect of agricultural health and safety?”

Procedures

The ACE team first selected the two project areas, High School Curriculum and Professional development projects, because each Center could provide a project to participate. At the same time, criteria were set by the team that selections needed to include a research design that allowed for pre/post or cross group comparisons. The ACE team members then sought permission from each PI (principal investigator) of the provisionally selected projects to have their project included and confirmed their willingness to share data related to outcome measures.

The next step involved the development of logic models for each participating project illustrating resources, aims, procedures, target group and outcome variables. The logic models helped the team members identify those outcomes that would be most appropriate to include and also allowed the team to double check with the PIs to make sure the aims and measures were correct. This step was key as the ACE team members were able to identify changes that were occurring in the projects as the realities of applied research began to have an impact on a number of the project's designs.

The ACE report for fiscal year 2006 contained abstracts of each of the projects originally identified to participate in the cross site experiment. As the process of writing and editing these abstracts took place, it became clear that some of the projects would not be included in the final cross site process. The reasons for dropping some projects will be addressed by project area in the next section. Table 8 presents the four projects originally identified in the High School Curriculum area and Table 9 presents the seven projects related to professional development.

Table 8. High school curriculum projects by Center and title

Center	Project Title
HICAHS	Colorado and Wyoming High School Agricultural Health and Safety Curriculum Study
Pacific Northwest	Health and Safety Awareness for Working Teens Ag Curriculum Evaluation
Southeast	Partnerships for Preventing Farming-related Injuries to Rural Youth (PFIRY)
Western	Impact of School Agriculture Safety Curriculum on Injury Risk

Table 9. Professional development projects by Center and title

CENTER	PROJECT TITLE
National Children’s Center	Interdisciplinary Collaboration for Children’s Agricultural Health and Safety
Great Lakes	Evaluating for Impact GLCASH Fellows Program
Great Plains	Student and Health and Safety Professionals and Rural Health Care Providers
Northeast	Improvements in Migrant Farmworker Occupational Healthcare
Pacific Northwest	Communication of Pesticide Health Risks for Children of Ag Families
Southern Coastal	Educating Agricultural and Health Practitioners about the Agricultural Health Study
Southwest	First Aid for Rural Medical Emergencies

Reality Constraints and Limitations

High School Projects: For reasons unique to each project and ever present limitations encountered in applied research, some projects originally selected were not able to follow their original designs and were dropped from consideration. Prior to presenting results, reasons for each of the projects dropped will be briefly reviewed.

Of the original four High School based projects, two were unable to continue as planned. The Western Center project (Impact of School Agriculture Safety Curriculum on Injury Risk, Stephen A. McCurdy, PI) was revised from a pre/post design to a descriptive one, with data collected only once per student. The complexities and time required to work in ten rural public high school districts made the timeframe unreasonable. The project did collect a large amount of descriptive data, including detailed agricultural injury information from 1783 respondents, one-third of whom lived on a farm.

The second high school project unable to participate (Health and Safety awareness for Working Teens Ag Curriculum Evaluation, Darren Linker, PI, was delayed in implementation due to several issues related to working with existing state

curriculum and a request from teachers to receive training prior to implementation. This project is currently ongoing, but not in time to provide data for this report.

Professional Development Projects: Three projects were dropped from the Professional development cross site evaluation. The first identified as not meeting criteria was Student and Health and Safety Professionals and Rural Health Care Providers, Murray Madsen, PI. As early in 2007 it was learned that this project, while having extensive curriculum design and several measures (course evaluations and final exams) did not have a pre/post measure to look at change, nor did it have a control group to compare with. A second professional development project, Interdisciplinary Collaboration for Children’s Agricultural Health and Safety, Deborah B. Reed, PI, was a short term pilot project funded by the Children’s Center and ended up not having an adequate sample size in the given time period to provide the necessary pre/post comparison. The final project that did not provide results, Educating Agricultural and Health Practitioners about the Agricultural Health Study, Julia Storm, was caught in the process of Center reapplication and a change in Center representation to the ACE team. A report on this project was not received in time to include in this report.

Table 10. Projects included in cross-site evaluation – High School Curriculum

CENTER	PROJECT TITLE
HICAHS	Colorado and Wyoming High School Agricultural Health and Safety Curriculum Study
Southeast	Partnerships for Preventing Farm-related Injury to Rural Youth (PFIRY)

Results – High School Curriculum

The two projects that were completed and able to provide results to the ACE project were from the Southeast Center and HICAHS. The abstracts of these projects follow the results. It is important to keep in mind that while they both sought to increase knowledge, change behavior, and measure injury incidence, the curriculum topics in each project were quite different. Each project utilized different designs, types and sizes of sample and instruments to measure outcomes. The PFIRY project utilized pre/post measures with three non-equivalent comparison groups in one state; the HICAHS project utilized randomly assigned treatment and control groups in two states, with pre/post measures. The topic of the knowledge tested and reported in the Southeast Center study was only one of multiple areas and measures utilized. The HICAHS study information included here (acquisition of knowledge) is also only one of multiple measures, and addresses knowledge in nine health and safety areas. The Southeast Center study worked through the state social science curriculum to include knowledge related to economic consequences of agricultural injury and death.

Table 11. Knowledge Acquisition Farm Safety & Economics test by comparison group PFIRY

Group	n	Mean Score (% correct)	SD
Control	104	43.1	10.17
Partial	73	51.0	14.35
Full	73	49.4	13.74

F value = 10.49, $p=.0001$, 32 items

The HICAHS study utilized curriculum developed for vocational agriculture classes, to increase knowledge related to potential hazards in nine specific areas.

Table12. Knowledge Acquisition Colorado Post tests by comparison group Agricultural Curriculum Project

Group	n	Mean Score	SD
Treatment	145	35.28	7.15
Control	80	27.72	5.41

$t=8.68$, $p=.000$, 50 items

The results presented in both tables are based upon the knowledge gained in the respective topics, a small part of each project's overall information sought.

Colorado and Wyoming High School Agricultural Health and Safety Curriculum Study

High Plains Intermountain Center for Agricultural Health and Safety

Project description: This 5-year longitudinal study evaluated a CD-based agricultural health and safety educational curriculum developed for youth between 15 and 17 years of age who are exposed to a wide range of hazards found in the farm and ranch environments of Colorado and Wyoming. The innovative and flexible curriculum was designed to be either free-standing or inserted into existing school curricula. It was developed around the developmental stage of the targeted students and a needs assessment of local agricultural educators. The nine-modular curriculum provided information on hazard and safety issues involved in: (1) the use of tractors, ATVs and garden machinery; (2) the handling of horses, livestock, agricultural chemicals and volatile organic compounds; (3) being around stored grain, organic dusts, electrical conduits and power lines; and (4) emergency rescue procedures.

Methods: The study utilized pretest, posttest, and post-posttest and repeat measures quantitative methodologies and semi-structured family interviews, with random assignment to study and control (standard curriculum) groups. The curriculum was taught in rural high school agriculture classes in Colorado and Wyoming (data is only available from Colorado). The study evaluated: (1) students' acquisition and retention of prevention knowledge (using a 50 item multiple choice questionnaire); (2) changes in students' attitudes toward safety (via semi-structured parental interviews); (3) changes in students' safety-related behaviors (via semi-structured parental interviews); and (4) changes in the incidences of agriculture-related injuries and illnesses (via self-report instrument completed by participating youth at 6-month intervals). Initially 39 school districts and 453 students (253 in the study group and 200 in the control group) were recruited. Approximately 28 parents in the study group and 15 parents in the control group were interviewed.

Results: *The following data only reflect that which was gathered in Colorado.* The study group showed a substantial increase in knowledge scores from pretest of 26.45 to posttest of 35.28, while the control groups scores went from 26.75 to only 27.72 (t-test, $p=0.0005$). A number of additional measures were utilized by this project including parent interviews seeking behavior change, injury incident reports, etc. These can be accessed in the Center close-out report.

Conclusions: The CD evaluated in this project is thought to be generally effective as a useful "add on" to what students get in regular agricultural curricula. Part of the CD curriculum's attractiveness was its use of technology in delivering the content, and its modular flexibility that allows for integration into already existing curricula and smooth incorporation into established course outlines. There was evidence of the curriculum's lingering impact fully 1.5 years after participants were exposed to it. Parents saw education (curriculum plus teacher) as one important component in an array of factors, such as developing maturity, family dynamics, and experience (vicarious and real), that interact and act synergistically in achieving in their children an awareness and a level of integration that coalesces into adequate knowledge, proper attitudes and positive behaviors towards achieving and maintaining deliberate health and safety best practices on the farm and ranch.

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**Partnerships for Preventing Farming-related Injuries to Rural Youth (PFIRY)
Engaging High School Students in Activities to Prevent Tractor-Related Injuries**

The Southeast Center for Agricultural Health & Injury Prevention

Description: This 2 year pilot project (2004-2006) involved high school students, age 14 to 18 years, in activities for preventing tractor-related injuries, specifically those that result from roadway collisions, overturns, and run-overs. The project used narrative simulation exercises and a computerized cost-analysis tool to engage students in four rural counties in thinking critically about the personal and social costs of farm-related injuries and the cost effectiveness of prevention. The project aimed to increase students' understanding of the importance and value of multiple preventive measures. The project sought to lower farm tractor-related injuries through a variety of partnerships between university researchers and members of at-risk communities. A team of researchers from the University of Kentucky partnered with FFA and vocational agriculture teachers and their students in four rural Kentucky county high schools. In these schools 35% to 40% of the students lived or worked on farms.

Methods: The study involved 708 students in two intervention county school systems and in two control counties (eight rural public high schools overall). After field-testing and refinement of the project materials and initial teacher training, demographic data and pretest measures were collected from 377 students in four high schools in the two intervention counties. Students completed multiple instruments, the one for this assessment as a pre and post measure was Farm Safety and Economics (FSE1, FSE2), a set of two 32-item parallel form instruments that measure attitudes, as well as basic knowledge, about the economics of farm safety practices.

Results: After a detailed analysis of student data, there were no statistically significant differences found in the students' mean *Thinking* or *Talking* about safety across the control, partial and full treatment groups. These non-significant differences may be partially explained by a higher percentage of farm-involved teens making up the control and partial treatment group when compared to those comprising the full treatment group. However, analysis of the FSE scores found a statically significant difference in means between the partial treatment group and control groups, as well as the full treatment and control groups. The mean scores for the control, partial and full treatment groups were 43.1, 51.0 and 49.4% respectively. The effect size for the FSE test was small, yet significant as well. Classroom observations and teacher's reports confirmed that students with farming experience were more interested in the project simulations and cost tools that those without such backgrounds.

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Table 13. Projects included in cross-site evaluation – Professional Development

CENTER	PROJECT TITLE
Great Lakes	Evaluating for Impact GLCASH Fellows Program
Northeast	Improvements in Migrant Farmworker Occupational Healthcare
Pacific Northwest	Communication of Pesticide Health Risks for Children of Ag Families
Southwest	First Aid for Rural Medical Emergencies

Results – Professional Development

The results related to the projects included under Professional Development are even more complex to report and again we refer readers to the abstract of the included projects as they help to explain in more detail target groups and methods. As with the High School projects, each included project did achieve positive results in either pre/post or comparison groups. The Great Lakes project sought to develop and test a web-based course to teach evaluation skills to professionals in communities that otherwise would not have access to such college level course information. The original intent was to enroll 25 participants, eleven enrolled, but only 5 completed the course and all of the test materials. The pre/post testing results on those participants gave a clear indication that knowledge related to evaluation skills were gained; the average score per participant increased on each skill as well as overall. The mean pretest score was 87.6, (range was 64 – 112) the mean post test score was 123.2 (range 99-143).

The Northeast Center prepared a manual to assist health care workers in rural clinics with the care of migrant farm worker occupation health issues. The project utilized four clinics with different approaches to providing information about the manual, one of the clinics served as a control. One clinic received just the manual, one received the manual and a PowerPoint presentation, and the third clinic received the manual, the PowerPoint and some on-site training related to migrant occupational health. A survey at the end of the study found no significant differences related to knowledge acquisition,

due in part to low participation, but did clearly support the on-site training in relation to the manual to assist clinicians.

The Pacific Northwest Center provided training to 21 mid-level health care providers in a workshop to enhance their knowledge and communication skills to related to the health risks of pesticide exposure to children in agricultural settings. The project utilized pre/post tests to address knowledge gain. As the data in Table 14 indicates there was a significant gain in knowledge related to pesticide health risks for children.

Table 14. Pre/post test Scores from the Tierra Learning Center Workshop

Test	N	Mean Score% correct	SD
Pre test	21	34	15.3
Post test	21	85	11.7

The Pacific Northwest Center also developed a web-based CME course based upon a similar curriculum that includes tests that must be submitted for course credit. Results from the first 9 health care professionals who have taken the course are reported in Table 15 below. All nine respondents improved their scores, with a range from a high of 33% improvement to a low of 7% improvement.

Table 15. Organophosphate Pesticides & Child Health CME Pilot Pre/post test scores by % correct.

Test	N	Mean Score% correct	Range
Pre test	9	58	40 – 73%
Post test	9	80.33	66 – 93%

The final professional development project was from the Southwest Center and sought to increase nursing student knowledge related to “First Aid for Rural Medical Emergencies” (F.A.R.M.E.). A total of 52 students completed the pre/post tests related to knowledge gained. A number of other measures were utilized (please see the abstract) but are not reported in the cross site data. The data reported in Table 16 below indicate that the treatment group scored significantly higher in all four topics addressed: First aid and Anticipatory Acquisition. Results also suggested that students in the treatment group had significant increased in knowledge of safety and injury prevention and in anticipating needed action for first aid and prevention of injury through reducing risk factors.

Table 16. Post Test Scores for Knowledge Acquisition – First Aid

Group	N	Mean post test score	SD
FARME	21	6.78	.42
EHC	31	5.1	1.36

t=5.77, p=.0001, 8 items

Table 17. Post Test Scores for Knowledge Acquisition – Safety and Injury Prevention

Group	N	Mean post test score	SD
FARME	21	7.14	.69
EHC	31	6.81	2.00

t=2.9, p=.006, 9 items

EVALUATING FOR IMPACT GLCASH FELLOWS PROGRAM

Great Lakes Center for Agricultural Safety and Health Education and Prevention

The GLCASH (Great Lakes Center for Agricultural Safety and Health) Fellows program is a 20 month web-based educational and mentoring program for agricultural safety and health practitioners. Through the Fellows program, participants expanded their knowledge and skills related to documenting the impact of agricultural health and safety outreach/education programs. Pre and post test scores indicated an increase in knowledge regarding evaluation skills; mean pre test score was 87.6, mean post test score was 123.2. As they went through each web-based lesson, the fellows worked with a mentor to apply this knowledge to developing and implementing an evaluation of an agricultural safety and health program in their community. Through the support of a mentor and the other fellows in the program, the participants not only broadened their knowledge, but practiced evaluation skills as they documented the impact of a program. The results of the evaluations were presented in a symposium and were made available to others and to assist them in assessing the impact of programs. The web-based educational program is available for others to use to expand their skills through SAMMIE (Successful Assessment Methods and Measurement In Evaluation) which is a website with open access to potential students to start and end in their own time frame.

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Improvements in Migrant Farmworker Occupational Healthcare: Pilot Testing the Introduction of the Migrant Clinician's Reference Manual

Northeast Center for Agricultural Safety & Health

Project description: Results from a NYCAMH/NEC surveillance study of occupationally related migrant farmworker injuries in the Northeast reveal that, on average, 15% of migrant visits to health centers involve a work-related injury or illness, yet 85% of migrant clinicians have little or no formal occupational health training. A migrant clinician's reference manual was developed with input from the agricultural and medical communities to address this gap. The manual was pilot tested during the 2005 harvest season to determine the most effective way to introduce the manual to migrant clinicians.

Methods: Three migrant health centers were each appointed one of the following introduction methods: 1) A PowerPoint presentation depicting the various aspects of the manual prior to manual distribution, followed by an occupational health training; 2) A PowerPoint presentation depicting aspects of the manual prior to manual distribution; 3) Manuals were sent to the health center by mail with a letter requesting that they be available for providers to use. Each health center received three copies of the manual. In addition, there was a designated control health center which did not receive the manual. At the end of the harvest season, surveys concerning the utility and usefulness of the manual were distributed to the providers, which were completed and returned to NYCAMH.

Results: All centers felt they had adequate resources to treat migrant farmworkers with occupational injuries, and all centers thought that the manual was helpful to some extent. The centers receiving a more thorough introduction used the manual more frequently. In all cases, power was not high enough to be statistically significant due to the small sample size.

Conclusions: The sample size was too small to make any significant conclusions, but the trend is that providing an occupational health training workshop is more effective in terms of providers finding the manual more helpful and using it more often.

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Communication of Pesticide Health Risks for Children of Agricultural Families

Pacific Northwest Agricultural Safety & Health Center

Introduction: This two-year project provides health care providers with current scientific information regarding neurodevelopmental health risks of children's organophosphorus (OP) pesticide exposure for health care providers in agricultural communities, with special emphasis on providers who serve agricultural producers, workers, and their families.

Methods: Early work included a state of the science review of the state of OP pesticide exposure, toxicity, and genetic susceptibility regarding neurodevelopmental health in children. This review was translated into clinically relevant training programs for the health care providers who see agricultural workers in their practices. Providers were typed as physicians, mid-level practitioners (MLP's) and community health workers (CHWs) or promotoras. As the first step, a needs assessment was conducted with these providers which identified the appropriate education strategy for each discipline. A preliminary curriculum was next designed and field tested at a workshop conducted at the 2006 Western Migrant Stream Forum, in Portland, Washington. From this, two educational delivery methods were developed: A web-based continuing education course for physician and MLP's and a workshop using popular education, adult learning methods for CHWs. The workshop was held in May 2006 in Leavenworth, Washington. Training was evaluated by assessing participant satisfaction and knowledge gain through conventional pre and post tests. The web-based course was launched in winter 2007 and incorporates a knowledge test for those applying for CME or CNE credits.

Results: The needs assessment showed that half of the providers had no previous training on pesticides, with the MLP's having the least amount of training. The majority of providers had an interest in more information. CHW reported using pesticides information most frequently, with MLP's and physician's use decreasing respectively. Popular education workshops were preferred methods for CHW's while web-based training was the preferred method of physicians and mid-levels. The preliminary curriculum field test at the Migrant Stream Forum workshop which was data-driven using power point slides, showed an increase of knowledge (70%) for all but the CHW's. Using their preferred learning strategy in the second workshop, the CHW 's increased correct responses from 34% in the pretest to 85% in the post test. Results for the web-based continuing education course also indicated an increase in scores from pre to post testing for the first nine participants who piloted the web based version in the winter of 2007.

Conclusions: There is a need for training health care providers in pesticide health effects, including physicians, mid-level practitioners and community health workers. For each type of provider there needs to be a targeted approach to educational format and materials. Popular education formats are an effective means for educating community health workers on pesticide effects in children. Further conclusions may be drawn from the pending web-based continuing education course.

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FIRST AID FOR RURAL MEDICAL EMERGENCIES

Southwest Center for Agricultural Health, Injury Prevention, and Education

Project Description: Nursing students researched and assembled a manual, First Aid for Rural and Medical Emergencies (F.A.R.M.E.) as a training tool for rural fire departments and emergency services. The material has been organized and offered as a university level on-line course with a community practicum component.

Methods: A pretest-posttest, quasi-experimental, non-equivalent control group design was employed to examine the differences in knowledge, anticipatory actions, safety and health protection perception, and self-efficacy among students enrolled in a first aid course. Descriptive analysis of themes emanating from open-ended questions was also employed. Students enrolled in one of two classes: both electives – First Aid for Rural Medical Emergencies or Emergency Health Care (EHC) course. The project utilized a non-probability convenience sample. A total of 52 students completed the pre and posttest measures and were included in the final sample (F.A.R.M.E. group=21 and EHC group=31).

Results: An independent-samples t-test was conducted to evaluate the hypothesis that students enrolled in the F.A.R.M.E. course would retain more information than those enrolled in a traditional lecture type class addressing emergency care and first aid. The t-test score was significantly higher for those enrolled in the F.A.R.M.E. course when compared to those enrolled in the EHC Course in two out of the four measures: Knowledge acquisition – First Aid and Anticipatory Acquisition – Safety and Injury Prevention. As expected, all posttest scores were significantly higher for those enrolled in F.A.R.M.E. course than those in the EHC course. Within group comparisons were made using paired t-test analyses. Only one comparison is significant in the comparison group: Anticipatory Action – First Aid. In the F.A.R.M.E. group, participants scored significantly higher at posttest scores for three out of four measures. While the mean score for Knowledge Acquisition – First Aid was higher at the end of the semester than at the beginning, statistical test suggest that the gain in knowledge was not substantially greater. This may be explained by the fact that many students enrolled in the courses have taken first aid courses in the past. They did, however, gain significant increases in knowledge of safety and injury prevention and in anticipating needed action for first aid and prevention of injury through reducing risk factors while working on the farm. Between and within group comparisons were conducted to evaluate the hypothesis that students enrolled in the F.A.R.M.E. course would think and talk about safety and health protection significantly more often than those enrolled in the EHC course. Using independent and paired t-test analyses, this hypothesis is supported. To evaluate self-efficacy of students in both groups, two scales were adapted from the Patterns of Adaptive Learning Scales. The third hypothesis, there is no pre-test difference in skill performance self-efficacy between those enrolled in the F.A.R.M.E. course and those enrolled in the EHC Course, was supported in this study.

Conclusions: After the completion of the course, a focus group session was held with 8 students who were enrolled in the course. Participants' comments support the course's ability to not only provide an opportunity for students to teach farm communities first aid and injury prevention skills, but also to raise awareness within the healthcare profession as to the need for academic exposure to the course content.

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Summary – Cross Site Project Outcome Assessment

The outcome assessment experiment across Centers and projects proved to be a challenging task for a number of reasons.

- Projects available to be included had already been funded and were in process.
- In each project, aims may have addressed prevention education, but the topics for that education were quite varied.
- Research designs varied from pre-experimental to quasi-experimental.
- Reality constraints of applied research reduced the initial selections in both types of projects.
- No two projects utilized the same instruments, sampling designs or measures.
- Size of participant groups varied tremendously.

In spite of these many challenges there have been some very positive results in addition to the research results themselves. The ACE team members were tireless in their pursuit of this task, and the PIs of the projects were truly wonderful in their willingness to be a part of this aspect of the ACE team effort, even though it meant additional effort on their part and the need to share their data for yet another report. The ACE team continues to be a very successful collaborative venue for the Agricultural Centers.

A number of very positive outcomes also resulted from these projects. These include the fact that all of the projects included yielded some very useful results for future researchers as well as for their own Center personnel. The projects also provide models of approaches to health and safety prevention education that work (e.g. increased knowledge acquisition) and those models are particularly useful in illustrating the challenges and methods of overcoming challenges in applied research. The multiple design approaches chosen by PIs illustrate different methods of gaining successful participation, of working with existing organizations, and utilize creative ways of accomplishing research in the “real world” e.g. intersecting with participants normal lives.

Trend Analysis

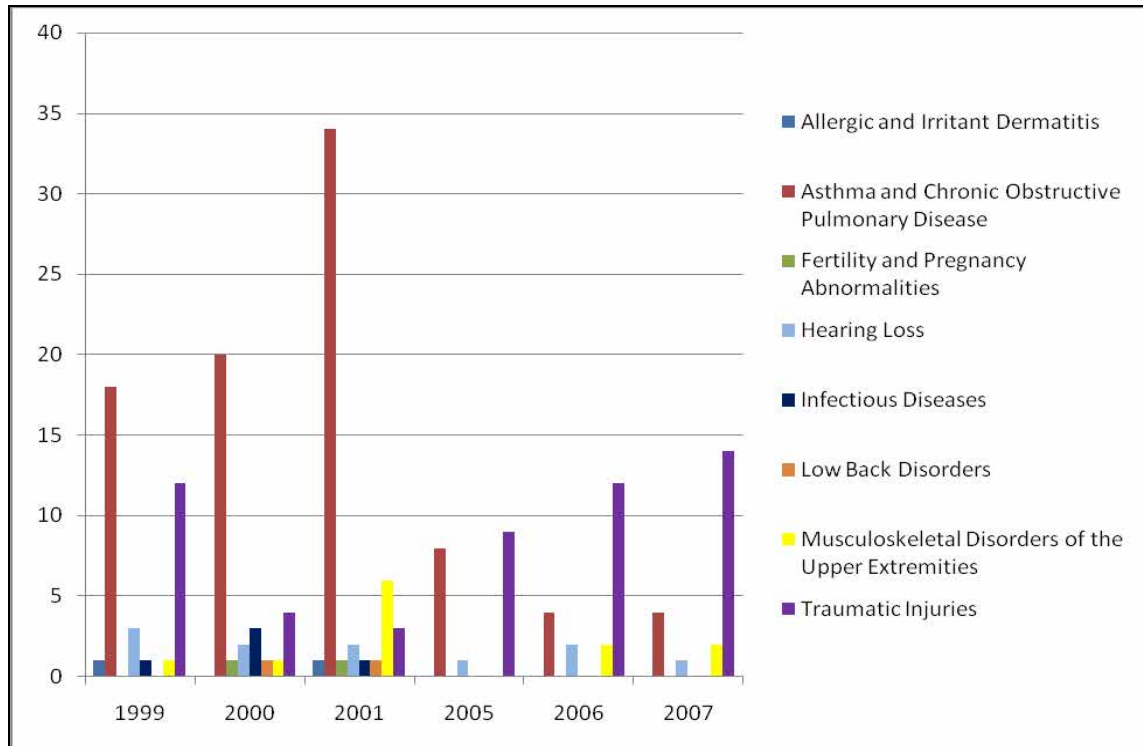
One advantage of the program monitoring approach to evaluation is the potential for tracking trends over time. While there are limitations in our effort to utilize this particular tool with the ACE process which will be discussed below, a few observations are possible.

NORA I Research Categories

Perhaps the most easily traced variable that has been collected is related to the NORA categories that research efforts of the Agricultural Initiative have identified. In the first major category “Disease and Injury” the trend has been a reduction in projects

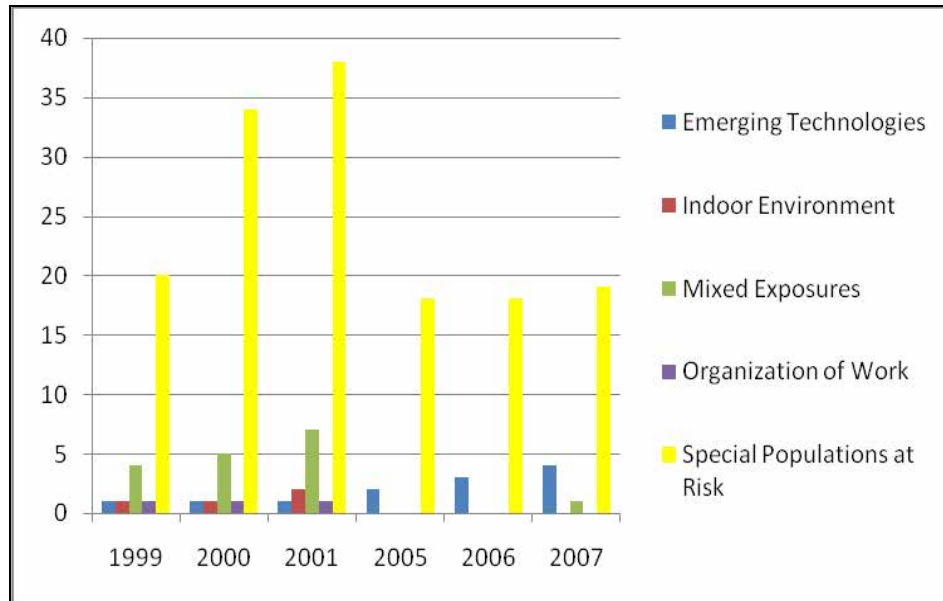
addressing Asthma and Chronic Obstructive Pulmonary Disease. The subcategory of Traumatic Injuries suffered a dip in 2000-2001 and then returned to actually increase in 2007. This increase is notable given the reduction in number of funded projects. Several subcategories in this section have not been addressed at all since 2005; these include Fertility and Pregnancy Abnormalities, Infectious Diseases and Low Back Disorders.

Figure 3. Number of Disease and Injury projects by NORA subcategory per year



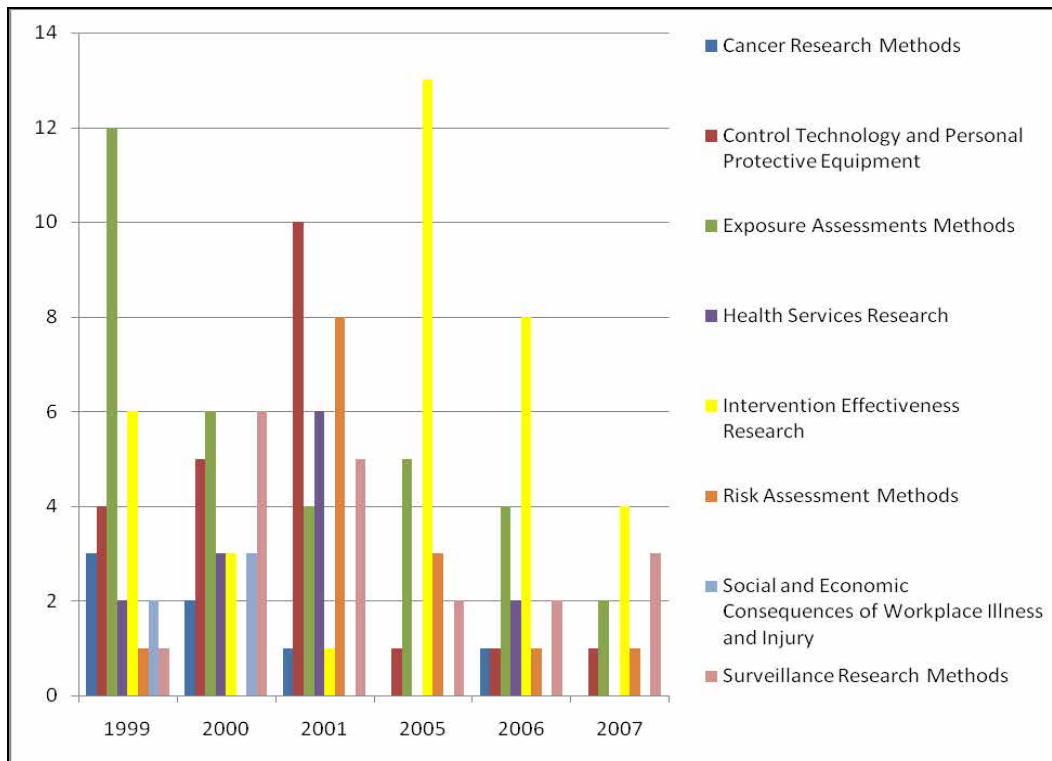
The second major category, Work Environment and Workforce has seen an increase in the number of projects addressing Emerging Technologies. While there has been a drop in the projects addressing special populations at risk, it consistently has remained the most selected category for research projects since 1999. The subcategories in this section that have not had identified research projects include Indoor Environment, and Organization of Work.

Figure 4. Number of Work Environment and Workforce projects by NORA subcategory per year



The third major category, Research Tools and Approaches, has seen a drop in the number of projects across all subcategories. There has been a switch in focus from Control Technology to Intervention Effectiveness. One category has not seen any project activity across the Center Initiative since 2000, Social and Economic consequences of Workplace Illness and Injury. Another category that has seen a decline since 1999 is Cancer Research Methods.

Figure 5. Number of Research Tools and Approaches projects by NORA subcategory per year



Collaborators in Initiative projects.

Another indicator that is interesting to follow over the two ACE funding cycles provides an overview of Center collaboration efforts. There is some consistency across the years during which data was collected in the identification of with whom the various Center projects worked or sought assistance. Again, this is one of the variables that we have tightened the definition criteria on between the 1999-2001 and 2005-2007 cycles. Even with that caveat, the categories of have not changed appreciably. The largest number of collaborators were logically from the academic community, either interdisciplinary contacts, research institutes or other Universities. The second largest group over the years of data collection was also logical and reflects work with Cooperative Extension personnel to facilitate either research or r2p. The table below illustrates the top three categories of collaborators by year of ACE data collection.

Table 18. Top three collaborator groups identified by Center Initiative by year

YEAR RANK	1999	2000	2001	2005	2006	2007
1 st	Cooperative Extension	University/ Depts*	University/ Depts*	University/ Depts*	University/ Depts*	University/ Depts*
2 nd	Agricultural Organizations	Cooperative Extension	Cooperative Extension	Government Agencies	Health Care Providers	Health Care Providers
3 rd	Government Agencies	Health Care Providers	Government Agencies	Cooperative Extension	Schools	Agricultural Centers

* This category reflects the multi-disciplinary aspects of many of the projects and includes institutes and research centers, as well as other academic disciplines.

Limitations to trend analysis in the Agricultural Center Initiative.

As suggested above a number of limitations make trend analysis with the ACE evaluation process difficult. The primary limitation is that each ACE funding cycle included 1 pilot year and 2 full years of data collection, then a hiatus and another cycle with a pilot and two full years. The break reflects a lack of funding for evaluation for the Initiative between FY 2001 to FY 2005.

A second limitation relates to a measurement issue and reflects the growing ability of the ACE team to better define and tighten the indicator definitions of the variables included in the ACCESS database. This strengthening of the data reporting and collection process by the ACE representatives, while important for better reflecting the work of the Initiative, does impact the ability to address trends in more than a preliminary way, at this time.

A third limitation to trend analysis has been caused by the changing number and location of the Agricultural Centers. While some Centers have been consistently funded throughout the data collection periods, others have been dropped, received bridge funding, or been newly funded Centers. With these Center changes, come personnel changes that can, if there is no opportunity for upfront training, impact reporting consistency in the ACCESS database. Figure 6 below illustrates funding status of Centers over the years of ACE.

Figure 6. Center funding status by ACE reporting year

CENTERS	1999	2000	2001		2005	2006	2007
1. Deep South	●	●		↳			
2. Great Lakes					●	● *	→
3. Great Plains	●	●	●		●	●	●
4. High Plains Intermountain	●	●	●	↳	●	● *	→ ●
5. National Farm Medicine	●	●	●				
6. Northeast	●	●	●		●	●	●
7. Pacific Northwest	●	●	●		●	●	●
8. Southern Coastal					●	● *	→
9. Southeast	●	●	●		●	●	●
10. Southwest	●	●	●		●	●	●
11. Western	●	●	●	↳	●	●	●

● Fully funded
 * Changed status as of 9/30
 → Bridge funding
 (Blank) No funding

SUMMARY AND RECOMMENDATIONS

This report reflects the third year of funding for the 2004-2007 contract with HICAHS to provide leadership to the Agricultural Center Initiative Evaluation Project. Included are both summaries of the data related to the program monitoring research questions, as well as a report on the cross Center project outcomes assessment experiment. The representatives to the ACE project from the Agricultural Centers have vastly improved the monitoring process in this last funding cycle, through both carefully monitoring the activities and products of their Centers, and through gaining a better understanding of the purpose and goals of evaluation.

There have been both successful and less successful aspects of this venture that help lead to the recommendations listed below. A success has been the improvement in both the ACCESS database and the reporting from each of the Centers participating to the Initiative collective database. The outcomes assessment effort was indeed an experiment in and of itself. The ACE representatives achieved remarkable collaboration across both project areas the assessment sought to address, but the vast differences between the projects, measures and targets identified made cumulative statistical analysis unreasonable. The experience gained through attempting the cross Center multi project evaluation indicates that such efforts need to be carefully planned prior to

funding, and would require continuous contact between project PIs to monitor potential changes based upon the realities of applied research.

Recommendations

The following recommendations reinforce those that have been made in previous reports as well as suggest new ones reflecting changes in the Agricultural Center Initiative and the National Academy of Sciences (NAS) review of NIOSH.

- Each participating Center representative should receive funding to support their participation in evaluation of the Initiative.
- Each Center should be encouraged by NIOSH to continue to participate in whatever form Initiative evaluation takes in the future.
- Progress and Year-end report data should be able to be pulled directly from the ACE ACCESS database, or a database developed by NIOSH.
- For the Agricultural Center evaluation effort to provide the greatest benefit to all stakeholders, it is important to emphasize that it must remain consistently funded to follow trends within funding cycles and across time.

The following recommendations relate to the NAS review of AFF and are specific to the Agricultural Centers as a part of this sector:

- The NAS recommendation that “AFF should develop a comprehensive program evaluation mechanism” echoes the multisite suggestion in the Kennedy Report (1995); a concept upon which the ACE effort was initiated. This evaluation model should be continued.
- Should NIOSH pursue the NAS recommendation for a comprehensive program evaluation it should involve collaboration with the Centers in order to take advantage of the experiences gained since the ACE project’s inception.

Conclusions

The ACE team has now completed one pilot and two full years of program monitoring under the current contract. The results presented in the report describe diverse agricultural/forestry/fishing activities across different regions of the country seeking to prevent or reduce injuries and illness on behalf of those employed in these occupations.

The overarching recommendation is to continue to support the Initiative in this collaborative evaluation effort. Experience has illustrated that it is costly to interrupt multisite evaluation efforts.

The ACE team has done a remarkable job documenting the activities, products, outreach, and translation efforts of Initiative projects. The ability of the NIOSH funded Centers to respond to regional agricultural differences and needs is both the genius of the Initiative and the challenge to evaluation. In spite of fewer fully funded Centers, the Initiative has accomplished a great deal of work related to agricultural health and safety during FY 2007; both projects and products are identified in the appendices of the report. We believe that the Centers, through their in-kind participation in the ACE process, illustrate that they accept the charge to evaluate this important Initiative.

References:

Buchan, V. & Holmquist-Johnson, H. (Jan, 2007). *The NIOSH Agricultural Center Initiative Evaluation Project Fiscal Year 2006 Report*. (Contract # 212-2004-09852). HICAHS, Colorado State University. Fort Collins, CO.

www.bls.gov/news.release/cfoi.nr0.htm

Buchan, V. & Holmquist-Johnson, H. (Dec, 2005). *NIOSH Agricultural Center Initiative Evaluation Project –Pilot Report 2005*. (Contract # 212-2004-09852). HICAHS, Colorado State University. Fort Collins, CO.

Rossi, P. H., Lipsey, M.W. & Freeman, H. E. (2004). *Evaluation: A systematic approach* (7th ed.). Thousand Oaks, CA: Sage.

Holmquist-Johnson, H. & Buchan, V. (March, 2002). *NIOSH Agricultural Center Initiative Multisite Evaluation: A Program Monitoring Report FY 2001*. HICAHS. Colorado State University. Fort Collins, CO.

Buchan, V. & Tungate, S. (April, 2001). *NIOSH Agricultural Center Initiative Multisite Evaluation: A Program Monitoring Report FY 2000*. HICAHS, Colorado State University. Fort Collins, CO.

Tungate, S. & Buchan, V. (June, 2000.) *NIOSH Agricultural Center Initiative Multisite Evaluation Pilot Report*. HICAHS, Colorado State University. Fort Collins, Co.

Kennedy, S.M. (January, 1995). *National occupational safety and health program in agriculture: Report of an external committee to review the extramural cooperative agreement programs*. Washington, DC: National Institute for Occupational Safety and Health, Centers for Disease Control.

Center Projects Listed by Core

Center Abbreviations

Great Lakes Center for Agricultural Safety and Health Education and Prevention	GLC
High Plains Intermountain Center for Agricultural Health and Safety	HICAHS
Northeast Center for Agricultural Safety & Health	NEC
Pacific Northwest Agricultural Safety and Health Center	PNASH
Southeast Center for Agricultural Health and Injury Prevention	SE
Southern Coastal Agromedicine Center	SC
Southwest Center for Agricultural Health, Injury Prevention, & Education	SW
Western Center for Agricultural Health & Safety	WEST

Center Projects Listed by Core

Core	NORA Category	Project Title	Center	Contact Person
Administrative and Planning		ACE project	HICAHS	Vicky Buchan
		ACE Team Collaboration and Data Collection	SW	Sara Shepherd
		Administrative Core	SEC	Robert McKnight
		Administrative Core	PNASH	Marcy Harrington
		Administrative Core – SW Center for Agricultural Health, Injury Prevention, and Education	SW	Jeffrey Levin
		Ag Center Outreach and Education Projects	SW	Amanda Wickman
		Aghealth Seminar Series	WEST	Stephen McCurdy
		Agricultural Communication, Outreach, and Education Program	PNASH	Helen Murphy
		Agricultural Safety & Health Training for Public Health Graduate Students (HAP-TPG)	SEC	Robert McKnight
		Agricultural Safety Scholarship Program	SW	Helen Miner
		Analysis of Pesticide Exposure Among Mexican Immigrant Farmworkers	SW	S. Amy Snipes
		Center Administration – General	HICAHS	Steve Reynolds
		Farmer's and Rancher's Perception of Disability	SW	Nicholas Bingham

Core	NORA Category	Project Title	Center	Contact Person
Administrative and Planning		Maintain Associations	HICAHS	Steve Reynolds
		Ohio Regional Center for Agricultural Disease and Injury	GLC	Jay Wilkins
		Potential for Public Partnerships to Develop Certified Youth Tractor and Machinery Operations	SW	Robert Williams
		Professional Education	HICAHS	Steve Reynolds
		Project Development	HICAHS	Steve Reynolds
Education and Outreach		Aghealth Seminars Series	WEST	Stephen McCurdy
		Agricultural Communication, Outreach and Education Program	PNASH	Helen Murphy
		Communication of Pesticide Health Risks for Children of Agricultural Families	PNASH	Helen Murphy
		Developing and Testing Interactive CD Health and Safety Curricula for 4-H Youth	HICAHS	Vicky Buchan
		Enhancing Translation and Dissemination through Agricultural Partners	HICAHS	Darla Borges
		Fluorescent Tracer Component for Hands-on Pesticide Handler Training	PNASH	Kit Galvin
		Health and Safety Awareness for Working Teens – Agricultural Curriculum Evaluation Project	PNASH	Darren Linker
	Interventions to Minimize Worker and Family Pesticide Exposures	PNASH	Richard Fenske	

Core	NORA Category	Project Title	Center	Contact Person
Education and Outreach		Model Farmers Dissemination Project	SW	Deborah Helitzer
		Pesticide Record Keeping Education for Restricted-use Pesticide Applicators	NEC	Kay Moyer
		Previous Publications	HICAHS	Angi Buchanan
		R2P Agriculture Youth Safety	SW	Debra Cherry
		Reality Tales: Storytelling to Translate Agricultural Health and Safety Research	PNASH	Helen Murphy
		Theses/Dissertations	HICAHS	Steve Reynolds
		Vermont Farm Safety Program	NEC	George Cook
Multi-Disciplinary Research	<u>Disease and Injury</u>			
		Assessing Hearing Hazards in Farm Youth	NEC	Melissa Perry
		Characterization of Bioaerosols in Washington Dairy Barns	PNASH	John Scott Meschke
		Economics of Preventing Agricultural Injuries to Adolescent and Adult Farmers	SEC	Joan Mazur
		Engaging High School Students in Activities to Prevent Tractor-Related Injuries (Stakeholder's Project supplemental)	SEC	Henry Cole
	Health of Agricultural Populations	SEC	Robert McKnight	

Core	NORA Category	Project Title	Center	Contact Person
Multi-Disciplinary Research	<u>Disease and Injury</u>	Health Effects of Airborne Ag Particles from the Sacramento/San Joaquin Valley	WEST	Kent Pinkerton
		Identification and Prevention of Injuries in NW Orchards	PNASH	Matthew Keifer
		An Incentive Intervention Program to Encourage Ergonomic Behavior in Latino Farm Workers	PNASH	Helen Murphy
		Injury Risk Analysis in Large-Herd Dairy Parlors	HICAHS	John Rosecrance
		Nurse Agricultural Education Projects	SEC	Deborah Reed
		Occupational Risk of Infection Among Poultry Workers	NEC	Peter Rabinowitz
		Partnering with Stakeholders for Prevention	SEC	Henry Cole
		Prospective Study of Occupational Lung Disease and Endotoxin Exposure in Naïve (New) Dairy Workers	HICAHS	Steve Reynolds
		Study of Work Injuries in Farmworker Children – Continuation	SW	Sharon Cooper
		Sustained Work Indicators of Older Farmers	SEC	Deborah Reed
Teaching Public Health Students About Agricultural Safety and Health	SEC	Robert McKnight		

Core	NORA Category	Project Title	Center	Contact Person
Multi-Disciplinary Research	<u>Research Tools and Approaches</u>			
		Aquaculture Safety and Health	SEC	Mel Myers
		Developing and Testing Interactive Agricultural Health and Safety Curricula for 4-H Youth	SEC	Teresa Donovan
		Evaluation of an Ergonomically Improved Apple Bag	NEC	Suzanne Stack
		Introducing a Cholinesterase Test Kit into Clinical Practice	PNASH	Matthew Keifer
		Louisiana Healthy Farm Families Initiative-continuation	SW	Ann Carruth
		Poison Center Surveillance of Agricultural Poisonings	SEC	Robert McKnight
		Rapid Assays for Human and Environmental Exposure Assessment	WEST	Bruce Hammock
		Respiratory Health and Exposures on Large Californian Dairies	WEST	Frank Mitloehner
		Statewide Surveillance of New York State Farm Injuries	NEC	Melissa Brower
		Texas Panhandle Coalitions for Agricultural Safety and Health (PCAHS) – continuation	SW	Lana Skarke
		Workplace Determinants of Take Home Pesticide Exposure	PNASH	Richard Fenske
		<u>Work Environment and Workforce</u>		
	Automating Work Exposure Questionnaire for Subjects with Low Literacy Skills	PNASH	Matthew Keifer	

Core	NORA Category	Project Title	Center	Contact Person
Multi-Disciplinary Research	<u>Work Environment and Workforce</u>			
		Community Collaboration for Farmworker Health and Safety Project: Assessing the Capacity and Needs Within Maine's Broccoli Harvest	NEC	Mike Rowland
		Community Health Intervention with Yakima Agricultural Workers	PNASH	Matthew Keifer
		Developing a Culturally Sensitive Safety Program for Vietnamese Shrimpers in U.S. Coast Guard District 8 – continuation	SW	Jeffrey Levin
		Enhancements to Cholinesterase Monitoring: Oxime Reactivation and OP-ChE Adducts	PNASH	Chris Simpson
		Environmental Exposures and Parkinson's Disease	SW	Amanpreet Dhillon
		Farm Worker Health Research Program (MICASA)	West	Marc Schenker
		Horticulture Ergonomics and Safety Training Program	NEC	Andris Freivalds
		Migrant Adolescent Health Research Study	SW	Sharon Cooper
		Migrant Farmworker Health Care Utilization Survey	NEC	
	Neurobehavioral Assessment of Pesticide Exposure in Children	PNASH	Diane Rohlman	
	Pilot Testing Direct Postural Measurement Instrumentation in a Nursery Population	NEC	Nick Warren	

Core	NORA Category	Project Title	Center	Contact Person
Multi-Disciplinary Research	<u>Work Environment and Workforce</u>	Reducing Occupational Injuries and Illnesses in Migrant and Seasonal Tobacco Farmworkers Through Coalition of a Community Health Program and a Research Team	NEC	Lynae Hawkes
		Research to Practice for Safe Entry into Confined-Space Manure Storages	NEC	Harvey Manbeck
		Risk Factors for Cholinesterase Depression Among Pesticide Handlers	PNASH	Matthew Keifer
		Worker Health Protection Among Shrimp Fishermen of the Gulf Coast	SW	Jeffrey Levin
Prevention - Intervention		Assessment of Job-Related Exposures for Diarrheal Illness in Farmworker Families	PNASH	John Scott Meschke
		Community Collaboration for Farmworker Health	NEC	Lynae Hawkes
		Partnerships for Preventing Farm Injuries to Rural Youth (PFIRY)	SEC	Henry Cole
		Preventing Agricultural Work Injuries on the Navajo Nation – continued	SW	Deborah Helitzer
		Promoviendo Farmworker Safety	SW	Sylvia Partida
		Skills Retention in Fishing Safety Training	PNASH	Jerry Duzgan
		The Social Marketing of Tractor Rollover Protective Structures in New York	NEC	Julie Sorensen

Core	NORA Category	Project Title	Center	Contact Person
Tractor Safety Initiative		TSI: Ag Center Tractor Initiative	HICAHS	Steve Reynolds
		TSI: Designing Community-Based Social Marketing Programs for Tractor Safety	SW	Karen Gilmore
		TSI: Impact of Changes in ROPS Standards, Regulations and Technology on Future Tractor ROPS Availability	HICAHS	Juhua Liu
		TSI Project Designing Community-Based Social Marketing Programs for Tractor Safety	WEST	Stephen McCurdy
		TSI: Tractor Safety Initiative: Costs of Tractor Operator Injuries from Overtums and Highway Collisions	SEC	Henry Cole
		TSI: Tractor Safety Initiative: Designing Community-Based Social Marketing Programs for Tractor Safety (1R25-04-008542-01)	SEC	Chike Anyaegbunam
		National Tractor Safety Initiative	PNASH	Richard Fenske

Ag Center Products

Center Abbreviations	
Great Lakes Center for Agricultural Safety and Health Education and Prevention	GLC
High Plains Intermountain Center for Agricultural Health and Safety	HICAHS
Northeast Center for Agricultural Safety & Health	NEC
Pacific Northwest Agricultural Safety and Health Center	PNASH
Southeast Center for Agricultural Health and Injury Prevention	SE
Southern Coastal Agromedicine Center	SC
Southwest Center for Agricultural Health, Injury Prevention, & Education	SW
Western Center for Agricultural Health & Safety	WEST

* Product ready for distribution

Ag Center Products

Product Type	Product Title	Center	Language	Author(s)
Abstract	Adolescent pesticide exposures [Abstract submitted 2007 Jul; accepted for presentation at 2007 Nov 3-7 conference]*	SEC		Bryden, McKnight, Pollack
	Advances in immunodiagnostics for environmental contaminants and human monitoring	WEST		Hammock, Nichkova, Ahn, Kim, Gee, Dosev, Kennedy
	Chronic back pain in adolescent farmers	SW		Shipp, Cooper, del Junco, Cooper, Levin
	A computer-based survey instrument for exposure assessment among agricultural pesticide handlers*	PNASH		Hoffman
	Migrant adolescent worklife study*	SW		Levin
	Occupational health in commercial fishing along the Gulf Coast	SW		Levin
	Prevalence of obstructive lung disease in older Kentucky farmers, part I: objective and subjective indicators	SEC		Johnson
	Prevalence of obstructive lung disease in older Kentucky farmers, part II: reliability of respiratory questions	SEC		Johnson
	Respiratory health of Kentucky farm children*	SEC		Burkhart, Browning, Westneat, Knox, Abshire

Product Type	Product Title	Center	Language	Author(s)
Abstract	Stakeholder input & worker health protection in commercial shrimp fishermen of the Gulf Coast*	SW		Levin, Gilmore, Nalbone, Wickman, Shepherd, Carruth, Gallardo
Annual Report	2006 GLCASH Annual Report	GLC		Great Lakes Center
Article published, feature (trade publication)	Beat heat before illnesses hit*	PNASH		PNASH
	Children face a variety of dangers on farms*	SEC		Warren
	Down on the farm: agriculture risks same for kids, adults*	SEC		Schell
	Down on the farm: family focuses on avoiding injuries*	SEC		Schell
	Farmworker housing	PNASH		PNASH
	Fishing vessel safety project	SW		White, Vazquez
	Health workplaces and health communities are central to sustainable agriculture	PNASH		PNASH
	Hip belt reduces use of low back muscles in orchard workers	NEC		Stack
	Journalist workshop. Children and agriculture: telling the story*	PNASH		PNASH
	Ladders raise orchard injuries*	PNASH		PNASH
	Misuse of science serves no one	PNASH		Fenske

Product Type	Product Title	Center	Language	Author(s)
Article published, feature (trade publication)	NIOSH Agricultural Centers: Pacific Northwest Agricultural Safety and Health Center	PNASH		PNASH
	Parents send ATV warning*	SEC		Warren
	Protecting skin from sun's rays today prevents cancerous growths in future*	PNASH		PNASH
	Research addresses special populations*	SW		Levin
	Safety and health initiatives for east Texas farmers and ranchers*	SW		Gilmore
	Safety a topic at conference*	SEC		Parker
	Simulation and validation of hydrogen sulfide removal from fan ventilated confined-space manure storages*	NEC		Zhao
	Take heed in contact with OP pesticides*	PNASH		PNASH
	Tractor rollover deaths way down*	SEC		Warren
Articles published, professional (juried publication)	Vietnamese shrimp boat captain training – Abbeville, LA	SW		Vazquez
	Building community capacity for agricultural injury prevention in a Native American community	SW		Helitzer, Wilging, Hathorn, Benally

Product Type	Product Title	Center	Language	Author(s)
Articles published, professional (juried publication)	Child Health Needs of rural Alabama Latino Families*	SC		Harrison, Scarinci
	A descriptive study of workers' compensation claims in Washington state orchards*	PNASH		Hoffman, Snyder, Keifer
	Development and initial assessment of objective fatigue measures for apple harvest work	NEC		Earle-Richardson
	Development of a sensitive enzyme-linked immunosorbent assay for the detection of the glucuronide conjugate of 3-phenoxybenzyl alcohol, a putative human urinary biomarker for phyrethroid exposure*	WEST		Kim, Ahn, Ma, Gee, Hammock
	Effect of belt/bucket interface in apple harvesting*	NEC		Freivalds
	Electromyographic assessment of apple bucket intervention designed to reduce back strain: a preliminary project report*	NEC		Earle-Richardson
	Emerging technologies and the safety and health of farming people*	SEC		Myers
	Encouraging the installation of rollover protective structures in NY state: the design of a social marketing intervention	NEC		Northeast Center
Environmental exposure and health effect in concentrated animal feeding operations	WEST		Mitloehner, Schenker	

Product Type	Product Title	Center	Language	Author(s)
Articles published, professional (juried publication)	Estimating the occupational morbidity for migrant and seasonal farmworkers in New York State: a comparison of two methods*	NEC		Earle-Richardson
	A feasibility study of the use of dust wipe samples to assess pesticide exposures in migrant farmworker families working in the United States*	SW		Skipp, Cooper, Donnelly, Nalbone
	Human Metabolic interactions of environmental chemicals	SC		Hodgson, Rose
	Hydrogen sulfide emission rates and inter-contamination strengths in a fan ventilated confined-space manure storage*	NEC		Zhao
	An immunoassay for a urinary metabolite as a biomarker of human exposure to the pyrethroid insecticide permethrin*	WEST		Alm, Ma, Tsi, Gee, Hammock
	The impact of hearing impairment, perceptions and attitudes about hearing loss, and noise exposure risk patterns on hearing handicap among farm family members	SW		Carruth, Robert, Hurley, Currie
	Muscle recruitment changes in association with apple bucket hip belt use: laboratory and orchard testing*	NEC		Jenkins
	Next steps to reduce agricultural tractor overturn fatal and non-fatal injuries	NEC		Cole
	Orchard evaluation of ergonomically modified apple bucket*	NEC		Earle-Richardson

Product Type	Product Title	Center	Language	Author(s)
Articles published, professional (juried publication)	Personal protective equipment use and safety behavior among farm adolescents: gender differences and predictors of work practices.	SEC		Reed, Browning, Westneat, Kidd
	Pesticide safety training among farmworker adolescents from Starr County, Texas*	SW		Shipp, Cooper, del Junco, Bolin, Whitworth, Cooper
	Protecting young workers in agriculture: participating in tractor certification programs	GLC		Heaney, Wilkins, Bean, Dellinger, McGonigle, Elliott, Jepsen
	Psychometric evaluation of the John Henry self-efficacy scale in a sample of older farmers	SEC		Hatcher, Rayens, Reed
	Risk perceptions, barriers and motivators to tractor ROPS retrofitting in NYS farmers*	NEC		Sorensen, May
	Rollover protection on New York tractors and farmers' readiness for change*	NEC		May, Sorensen
	SAMMIE – using technology for a one-stop program evaluation resource*	GLC		Archer, Bruns, Heaney
	Seatbelt use during tractor overturns	SEC		Myers, Cole, Westneat
	Severe back pain among farmworker high school students from Starr County , Texas: baseline results*	SW		Shipp, Cooper, del Junco, Delclos, Burau, Tortolero

Product Type	Product Title	Center	Language	Author(s)
Articles published, professional (juried publication)	A Spanish language narrative simulation to prevent horseback riding head injury among rural youth	SEC	Spanish	Arrowsmith, Cole, Mazur
	Texas panhandle coalitions for agricultural safety and health (PCASH)*	SW		Carruth, Skarke, Gilmore
	Worker health and safety in concentrated animal feeding operations	WEST		Mitloehner, Calvo
Book chapter	Children's health in the rural environment	SW		Cherry, Huggins, Gilmore
Booklet	Strategic planning workbook*	SW		Southwest Center
	Tip booklet*	SW	Vietnamese	Gallardo, Levin, Nalbone, Lam, Vo, Wickman
Brochure	Advanced education and training in the health of agricultural populations*	SEC		McKnight, Donovan
	Fact sheet for eye safety*	NEC	Spanish	Hawkes
	Got Rops*	SC		Southern Coastal Center

Product Type	Product Title	Center	Language	Author(s)
Brochure	6 easy things you can do to help improve air quality*	WEST	Spanish	Meharg
	SW Center for Agricultural Health, Injury Prevention and Education brochure*	SW		Levin, Gilmore, Wickman
CD-ROM	The New York ROPS social marketing pilot project	NEC		May, Sorensen
	Partnerships for preventing farm injuries to rural youth: Excel-based cost analysis tools*	SEC		Myers, Cole, Piercy, Weastneat, et al.
Checklist	Farm tractor visual safety inspection checklist*	SEC		Piercy, Cole
Course manual	Workshop manual: children and agriculture: telling the story*	SEC		National Children's Center for Rural and Agricultural Health and Safety; Institute for Rural Journalism and Community Issues (Univ. of Kentucky)
Curriculum (short course)	Health effects of airborne ag particles from the Sacramento/San Joaquin Valley	WEST		Pinkerson

Product Type	Product Title	Center	Language	Author(s)
Curriculum (training)	First aid for rural medical emergencies*	SW	Spanish	PNASH
	Florescent tracer manual: an educational tool for pesticide educators*	PNASH	Spanish	PNASH
	Health and safety awareness for working teens in agriculture*	PNASH		PNASH
	Heat stress jeopardy*	PNASH		PNASH
	Pesticide risk communication education tool kit*	PNASH		PNASH
Database	The adolescent worklife study – database*	SW		Cooper
	Environmental exposures and Parkinson's disease	SW		Southwest Center
	PNASH Center 2005/2006 evaluation database*	PNASH		PNASH
	PNASH graphic resources* http://www.flickr.com/photos/pnash	PNASH		PNASH
	Review of heat stress and ladder injury educational materials	PNASH		PNASH
	ROPS hotline database	NEC		Northeast Center

Product Type	Product Title	Center	Language	Author(s)
Evaluation instrument/tool	Cholinesterase assay for human and rat plasma	PNASH		PNASH
	Indigenous Language Project survey*	SC		Southern Coastal Center
	Procedure for in vitro formation of cholinesterase adducts with clorpyrifos oxon and methyl paraoxon	PNASH		PNASH
	Sharing the road with farm vehicles safety awareness quiz (and answer key)	SEC		Cole, et al.
	Teacher project evaluation questionnaire (PFIRY)	SEC		Cole, et al.
Exhibit material	Demonstration of an ergonomically designed apple picking bucket and belt	NEC		Northeast Center
	PNASH table top display*	PNASH	Spanish	PNASH
	Proyecto MICASA	WEST	Spanish	Western Center
Fact sheet	2007 DEOHS calendar: agricultural safety and health*	PNASH		PNASH
	Assessment of job-related exposures for diarrheal illness in farmworker families*	PNASH		PNASH
	Bilingual Mayday cards in Vietnamese and English*	SW	Vietnamese	Southwest Center
	Characterization of bioaerosols in Washington dairy barns*	PNASH		PNASH

Product Type	Product Title	Center	Language	Author(s)
Fact sheet	Evaluation of skills retention in fishing safety training*	PNASH		PNASH
	Fluorescent tracer manual: an educational tool for pesticide safety educators*	PNASH	Spanish	PNASH
	Interventions to minimize worker and family pesticide exposures*	PNASH		PNASH
	Introducing a cholinesterase test kit into clinical practice*	PNASH		PNASH
	Neurobehavior assessment of pesticide exposure in children*	PNASH		PNASH
	Story telling to translate agricultural health and safety research*	PNASH		PNASH
	Test results for paraoxonase status*	PNASH		PNASH
	Workplace determinants pesticide exposure – results*	PNASH		PNASH
	Youth tractor injury fact sheet*	SW		Southwest Center
Manuscript	Agricultural safety and health in the United States, 1900-1999	SEC		McKnight, Myers
	Overcoming barriers to safe operation of agricultural tractors: insights from participatory, community-based social marketing (NIFS)	SEC		Anyaegbunam, McKnight, Donovan
	The economics of public safety and health: a community relevant approach to integrating real-work experience and required standards-based economic content*	SEC		Mazur, Swan, Cole, Myers

Product Type	Product Title	Center	Language	Author(s)
Manuscript	Factor structure of the Center for Epidemiologic Studies – depression scale; a study of women across the life span	SEC		Rayens, Hall, Peden, Hahn, Reed, Miller, Staten
	From research to practice: partnerships for preventing farming-related injuries to rural youth	SEC		Cole, Mazur, Westneat, Wilson
	Healthy worker effect related to tractor overturn injuries	SEC		Myers, Cole, Westneat
	High-throughput automated luminescent magnetic particle-based immunoassay to monitor human exposure to pyrethroid insecticides	WEST		Ahn, Lohstroh, Gee SJ, Gee NA, Lasley, Hammock
	Identifying the occupational health needs of migrant workers*	NEC		Hawkes, May
	Identifying the occupational health needs of migrant workers: a preliminary project report	NEC		Northeast Center
	Endosulfan induces CYP2B6 and CYP3A4 by activating the pregnane X receptor	SC		Southern Coastal Center
	Overcoming barriers to safe operation of agricultural tractors: insights from participatory, community-based social marketing*	WEST		Anyaegbunam
	Phage-borne analyte peptidomimetics accelerate the development of polyclonal antibody-based heterologous immunoassays	WEST		Kim, Gonzalez-Techera, Gonzalez-sapienza, Ahn, Gee, Hammock

Product Type	Product Title	Center	Language	Author(s)
Manuscript	Projected incidence and cost of tractor overturn-related injuries in the United States	SEC		Myers, Cole, Westneat
	Students' inspection of farm tractor roadway safety status*	SEC		Cole, Piercy
Newsletter	Ag Connections: agricultural safety and health spring 2007*	SW		Southwest Center
	Collaborative study in Colorado and California to determine the respiratory health risks of dairy workers*	WEST		Freeman, Childs
	El Melón Rondero	WEST	Spanish	Study team
	Northwest Forestland Worker Safety Review	PNASH		Harrington editor
	NYCAMH apple bucket study update for 2007*	NEC		Stack
	Statewide surveillance in New York State*	NEC		Brower
	A summary of findings	NEC		Brower
Poster	Accessibility of poison control center hotlines to Spanish-speaking callers (poster/Senior thesis)*	SEC		Garnett, McKnight, Spiller
	A community based participatory approach to understanding ergonomic affects of blueberry rake modifications*	NEC		Hawkes, May, Ginley, Santiago

Product Type	Product Title	Center	Language	Author(s)
Poster	Identifying risk factors for cholinesterase depression among pesticide handlers in Washington state	PNASH		Hofmann
	Immigration and acculturation factors related to perceptions about weight and BMI in California farm workers	WEST		Stoecklin-Marois, Hennessy-Burt, Butler, Schenker
	Inside Agromedicine Newsletter	SC		Southern Coastal Center
	Nurse agricultural education project*	SEC		Reed, et al.
	A program design for promoting farm health and safety through a family practice office	SEC		Claunch, Reed
	Ratio of non-fatal to fatal injuries of tractors without ROPS*	SEC		Cole, Myers, Westneat
	Research to practice: feasibility study of an ergonomic apple harvesting bucket*	NEC		Stack
	Shrimp boat captain training: scenario posters*	SW	Vietnamese	Levin, Nalbone, Gallardo, Lam, Vo, Wickman
	Smoking patterns in Hispanic farm worker families	WEST		Schenker, Stoecklin-Marois, Hennessy-Burn, O'Connor

Product Type	Product Title	Center	Language	Author(s)
Poster	Stakeholder input and worker health protection in commercial fishermen of the Gulf Coast*	SW		Levin
	Web-based CME course: organophosphates and child health: a primer for health care providers, http://depts.washington.edu/pehsu/pesticide/index.html	PNASH		PNASH
PowerPoint Presentation	Agricultural health and safety	HICAHS		Reynolds
	Agricultural impacts on your brain and respiratory system*	WEST		Pinkerton
	Agricultural infections A to Z*	SW		Levin
	Agroterrorism: what it is and what role can clinicians play?*	SW		Levin
	Air pollution, climate changes & health: what is science telling us?	WEST		Pinkerton
	Ambient pesticide air concentrations in Parlier; environmental justice project*	WEST		Segawa
	The biology of asthma: using animal models to investigate lung development and the impact of environmental factors	WEST		Pinkerton
	The body & air we breathe: impacts, challenges & solutions to valley air pollution	WEST		Pinkerton
The changing face of agriculture: older farmers*	SEC		Reed, Blahey	

Product Type	Product Title	Center	Language	Author(s)
PowerPoint Presentation	Costs of tractor operator injuries from overturns and highway collisions – progress report: year 2*	SEC		Cole, Myers M, Westneat, Douphrate, Rosecrance, Myers J, Rautiainen, Leigh, Schulman
	Designing community-based social marketing programs for tractor safety: formative research findings*	SEC		Anyaegbunam
	Effects of acculturation and food security on the child-parent feeding relationship among Latinos*	WEST		Kaiser
	Elevating food safety capabilities using wireless and remote emerging technologies	WEST		Zeidler
	Environmental influences on early lung development	WEST		Pinkerton
	Environmental solutions series: towards environmental health in the San Joaquin Valley	WEST		Pinkerton
	Ergonomics vs. bionomics for injury prevention*	WEST		Downing
	Evaluating power and participating in community based participatory research: evaluation results from EI Proyecto Bienstar*	PNASH		Postma
	Feasibility and efficacy of use of ROPS for ATV in farm*	HICAHS		Liu
	FFA students' inspection of farm tractor roadway safety status*	SEC		Cole, Piercy, Westneat, Heinz, Arrowsmith
Health & safety risk management	HICAHS		Reynolds	

Product Type	Product Title	Center	Language	Author(s)
PowerPoint Presentation	Housing conditions and the health of Mexican migrant farm laborers in California*	WEST		Vallarejo
	Immigration reform and its implications for farmers and workers*	WEST		Martin
	Misconceptions about older farmers' roles and value: implications for rural community public health and safety*	SEC		Cole, Murphy
	Nanoparticles & health	WEST		Pinkerton
	The narrative section of poison control center records: advantages and disadvantages to identifying agricultural poisonings*	SEC		Bryden, McKnight, Pollack
	New approaches for community-based participatory research among Central Valley Hispanic farm workers*	WEST		O'Connor
	New York State ROPS retrofit rebate hotline	NEC		May
	Northeast community collaborations for farmworker health & safety*	NEC		Northeast Center
	Pesticide and chemical safety*	SW		Southwest Center
	Pesticide poisoning in children	SW		Cherry
	Pesticide record keeping education for restricted-use pesticide application	NEC		Moyer
Providing health services to aging farmers: a practitioner's perspective*	SEC		Reed	

Product Type	Product Title	Center	Language	Author(s)
PowerPoint Presentation	Pulmonary collagen deposition in experimental models; a marker of acute injury or an early index of interstitial fibrosis? Phosgeneinduced pulmonary toxicity revisited	WEST		Pinkerton
	ROPS stand review in 2007*	HICAHS		Liu
	Safety and health in aquaculture	SEC		Myers
	Safety and health education for aging farmers and scarce resources, what are the implications?*	SEC		Anyaegbunam
	The social marketing of ROPS in New York State	NEC		Viebrock
	Southeast Center for Agricultural Health and Injury Prevention	SEC		McKnight
	Southeast Center for Agricultural Health and Injury Prevention; animated PowerPoint presentation	SEC		Donovan, et al.
	Stakeholder input in developing safety training for a unique agricultural work population*	SW		Levin
	Struggles and successes in El Pryesto Bienstar, a community based participatory research project for environmental and occupational health*	PNASH		Keifer, Sotelo
	Supporting a distributed research infrastructure: development and iterative testing of an online data collection system for a multi-state NIOSH grant*	SEC		Mazur, Swan G, Cole, Isaacs, Swan K

Product Type	Product Title	Center	Language	Author(s)
PowerPoint Presentation	Understanding the effects of extended handles on worker productivity, pain, and berry quality	NEC		Hawkes
	University – health department partnerships for public health: a recipe for success in addressing the needs of rural Hispanic populations*	SEC		Chamness, McKnight
	Using digital documentaries to advocate prevention: training public school teachers in the economics of preventing agricultural injuries*	SEC		Mazur, Swan, Cole, Myers
	Web-based CME course: organophosphates and child health: a primer for health care providers, http://depts.washington.edu/pehsu/pesticide/index.html	PNASH		Sommargren
	Working with disabilities among farmers, farm workers and ranchers*	WEST		Stiles
Questionnaire or survey instrument	4-H program priority survey*	SW		Wickman
	Activity/product data entry forms (MS Word)	SW		Southwest Center
	Computer-based exposure history questionnaire for cholinesterase depression among Hispanic pesticide handlers*	PNASH		PNASH

Product Type	Product Title	Center	Language	Author(s)
Questionnaire or survey instrument	A computer-based survey instrument for exposure assessment among agricultural pesticide handlers*	PNASH	Spanish	Homann, Keifer
	Expert interview questionnaire for interventions to minimize worker and family pesticide exposures	PNASH		PNASH
	Exposure history questionnaires for job-related exposures for diarrheal illness in farmworker families	PNASH		PNASH
	Farm worker health research program (MICASA)*	WEST	Spanish	Western Center
	Focus group guide*	SW	Spanish	Fossi, Gonzales, Partida
	Me and my farming experience (MMFE), e-part, 21-item instrument obtains baseline demographic data	SEC		Cole
	Questionnaire for pesticide exposure and neurobehavioral effects in children of farmworkers	PNASH		PNASH
	Questionnaire for skills retention in fishing safety training	PNASH		PNASH
	Radio recruiting strategy for personal safety/hazard stories from farmworkers	PNASH		PNASH
	Self-administered survey; interviewer-administered survey; clinical form*	SW		Shipp, Cooper, del Junco, Cooper
Stage of change/theory of planned behavioral survey	NEC		Northeast Center	

Product Type	Product Title	Center	Language	Author(s)
Questionnaire or survey instrument	Survey for introducing a cholinesterase test kit into clinical practice	PNASH		PNASH
	Survey of bioaerosol exposures in Washington dairy barns	PNASH		PNASH
Report (unpublished)	The adolescent worklife study – manual of procedures	SW		Shipp, Cooper
	Back pain, work, and health-related quality of life among south Texas adolescents*	SW		Shipp, Cooper, del Junco, Huber
	Cycle end report – SW Center for Agricultural Health, Injury Prevention, and Education*	SW		Levin, et al.
	Evaluation reliability and accuracy of cholinesterase test kit with various sample storage conditions	PNASH		PNASH
	NIOSH Agricultural Center Initiative evaluation project report*	HICAHS		Buchan
	PNASH center research review notes	PNASH		PNASH
	PNASH research to practice notes	PNASH		PNASH
	Progress report for the Southwest Center for Agricultural Health, Injury Prevention, and Education*	SW		Levin, et al.
	Self-study of the Southeast Center for Agricultural Health and Injury Prevention; 2007 Jan 11	SEC		McKnight, et al.

Product Type	Product Title	Center	Language	Author(s)
Report to NIOSH (year end or continuation)	Aquaculture safety and health; year 1 progress report	SEC		Myers
	Costs of tractor operator injuries from overturns and highway collisions: final report; 2007 Oct 25*	SEC		Cole, Myers M, Douphrate, Leigh, Myers P, Rautiainen, et al.
	Economics of preventing agricultural injuries to adolescent and adult farmers: year 1 progress report	SEC		Cole
	Final report to NIOSH*	PNASH		PNASH
	Nurse agricultural education project (phase II): year 1 progress report	SEC		Reed
	Poison center surveillance of agricultural poisonings: year 1 progress report	SEC		McKnight
	Southeast Center for Agricultural Health and Injury Prevention: progress report (2006 Apr)	SEC		McKnight
	Teaching public health students about agricultural safety and health: year 1 progress report	SEC		McKnight
Thesis or dissertation	Changes in clinical health indicators in a cohort of Australian farm families*	SEC		Blackburn

Product Type	Product Title	Center	Language	Author(s)
Website or webpage established	AgHERE list serve: nurses' roles in ag health and safety	SEC		Southeast Center
	Blood pressure categorization application on the web	SW		Cooper
	California dairy environmental health research initiative (Cal-Dehri)*	WEST	Spanish	Western Center
	Categorization of blood pressure: research and clinical implications	SW		Shipp, Cooper SP, Cooper CJ, del Junco
	GLCASH web site*	GLC		Great Lakes Center
	http://itsharepoint.uchc.edu	NEC		Northeast Center
	National tractor safety initiative*	PNASH		PNASH
	No way to meet a neighbor (web quest)*	SEC		Cole, Lehtola, Thomas, Hadley Stack
	The orchard ergonomic study webpage	NEC		
	Pacific Northwest Agricultural Safety and Health Center*	PNASH		PNASH
	SW Center for Agricultural Health, Injury Prevention, and Education*	SW		Levin, Gilmore, Wickman
	Tractor and motor vehicle web quest: whose responsibility is it to help prevent a tractor-motor vehicle collision?*	SEC		Cole, Arrowsmith, et al.
Web-based CME course: organophosphates and child health: a primer for health care providers, http://depts.washington.edu/pehsu/pesticide/index.html *	PNASH		PNASH	

Product Type	Product Title	Center	Language	Author(s)
Website or webpage established	www.ukcph.org/scahip *	SEC	Spanish	Donovan, et al.
Year-end report to NIOSH	Developing a culturally sensitive safety program for Vietnamese shrimpers in U.S. Coast Guard District 8*	SW		Levin, et al.
	Louisiana healthy farm families initiative*	SW		Carruth
	Panhandle coalitions for agricultural safety and health*	SW		Sharke
	Preventing agricultural work injuries on the Navajo Nation*	SW		Southwest Center
	A study of work injuries in farmworker children*	SW		Southwest Center

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